FEBRUARY, 1906

The Architect and Engineer

of California

IN THIS NUMBER:

Published by the
Architect and Engineer Company
San Francisco - - - Los Angeles

Single Copies 15 Cents *Yearly Subscription $1.00*

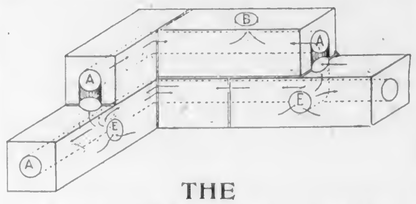
Phone MAIN 715

The J. Llewellyn Co.

Successor to G. W. CLARK CO. of S. F.
Dealers in
FOREIGN—DOMESTIC
WALL PAPER

Painters and Decorators, Wood Finishing, Paints, Oils and Varnishes, Picture Moldings, Window Shades, Art Glass Decorations

530 Sutter St., above Powell
SAN FRANCISCO
Oakland
1325 Broadway, opp. Post Office



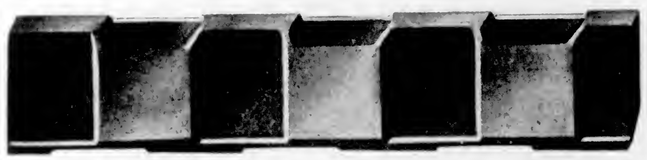
THE
UNDERWOOD VENTILATING
BUILDING BLOCK

STRENGTH, BEAUTY, DURABILITY

Showing inside corner of wall. No dead air pockets. Fresh air currents through the entire wall.

Three and Seven-foot Machines, double and single, for sale with territorial rights. Very reasonable.

Underwood Building Block Machine Co.
P. O. Box 598
Los Angeles, Cal.



CORRUGATED STEEL BARS FOR REINFORCED CONCRETE

50,000 Lbs. Elastic Limit. Mechanical Bond.

These bars are carried in stock in San Francisco, and can be furnished in any length up to 30 feet. Designs and Estimates furnished free of charge. Send for Catalogue.

Jno. B. Leonard, C. E., Agent

TELEPHONE GRANT 118

608 Crossley Building - - - San Francisco, Cal.

L. TOZER & SON CO.

DECORATORS AND DESIGNERS OF BEAUTIFUL INTERIORS
HIGH CLASS WALL PAPERS

Choicest selections of Foreign and Domestic lines. Most complete stock on the Pacific Coast, from the least expensive to the finest grades. Suggestions regarding the decoration of your home cheerfully extended. Send for samples.

PACIFIC COAST AGENTS FOR FABRIKONA BURLAPS

110 GEARY ST. SAN FRANCISCO, CAL. 762 MISSION ST.

Empire Plaster Company

Manufacturers of Hard Wall Finishing and Dental Plaster

SPECIFICATIONS FOR EMPIRE HARD WALL PLASTER

Metal lath three-coat work:
First or scratch coat—One part Empire hard wall plaster fibred, two parts sharp clean sand (fresh water sand preferable). Thoroughly mixed and applied within two hours after mixed.
Second or browning coat—One part Empire hard wall plaster, two parts clean sharp sand floated up even with grounds.
White or putty coat—One part Empire finishing plaster, three parts line putty gaged with hard wall plaster.
Sand finish—One part Empire hard wall plaster, two parts clean sharp sand.
Wood lath, two-coat work—One part Empire hard wall plaster fibred, two parts clean sharp sand (fresh-water sand preferable), mixed thoroughly and applied within two hours after mixing.
White coat and sand finish same as for metal lath.
Finishing coat should be applied within 48 hours after first coat is put on.

16th and Harrison Sts. San Francisco, Cal.

Office, Builders' Exchange, 106 Jessie St.
Box 245 Telephone Main 5110

or, Builders' Association, 318 Bush St.
Box 197

The San Francisco Artificial Stone Paving Company

H. L. PETERSEN

Artificial Stone Sidewalks, Concrete Walls, Foundations, Tanks, Reservoirs, Buildings, Etc.

Residence, 717 Treat Avenue *San Francisco, Cal.*

Phone MAIN 715

The J. Llewellyn Co.

Successor to G. W. CLARK CO. of S. F.

Dealers in

FOREIGN—DOMESTIC

WALL PAPER

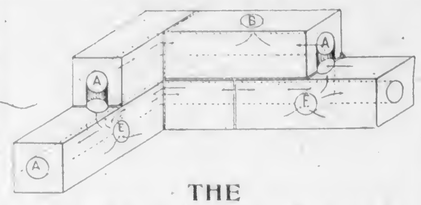
Painters and Decorators, Wood Finishing, Paints, Oils and Varnishes, Picture Moldings, Window Shades, Art Glass Decorations

530 Sutter St., above Powell

SAN FRANCISCO

Oakland

1325 Broadway, opp. Post Office



THE

UNDERWOOD VENTILATING BUILDING BLOCK

STRENGTH, BEAUTY, DURABILITY

Showing inside corner of wall. No dead air pockets. Fresh air currents through the entire wall.

Three and Seven-foot Machines, double and single, for sale with territorial rights. Very reasonable.

Underwood Building Block Machine Co.

P. O. Box 598

Los Angeles, Cal.

CORRUGATED STEEL BARS FOR REINFORCED CONCRETE

50,000 Lbs. Elastic Limit. Mechanical Bond.

These bars are carried in stock in San Francisco, and can be furnished in any length up to 30 feet. Designs and Estimates furnished free of charge. Send for Catalogue.

Jno. B. Leonard, C. E., Agent

TELEPHONE GRANT 118

608 Crossley Building - - - San Francisco, Cal.

L. TOZER & SON CO.

DECORATORS AND DESIGNERS OF BEAUTIFUL INTERIORS

HIGH CLASS WALL PAPERS

Choicest selections of Foreign and Domestic lines. Most complete stock on the Pacific Coast, from the least expensive to the finest grades. Suggestions regarding the decoration of your home cheerfully extended. Send for samples.

PACIFIC COAST AGENTS FOR FABRIKONA BURLAPS

110 GEARY ST. SAN FRANCISCO, CAL. 762 MISSION ST.

Empire Plaster Company

Manufacturers of Hard Wall Finishing and Dental Plaster

SPECIFICATIONS FOR EMPIRE HARD WALL PLASTER

Metal lath three-coat work:

First or scratch coat—One part Empire hard wall plaster fibred, two parts sharp clean sand (fresh water sand preferable). Thoroughly mixed and applied within two hours after mixed.

Second or browning coat—One part Empire hard wall plaster, two parts clean sharp sand floated up even with grounds.

White or putty coat—One part Empire finishing plaster, three parts line putty gaged with hard wall plaster.

Sand finish—One part Empire hard wall plaster, two parts clean sharp sand.

Wood lath, two-coat work—One part Empire hard wall plaster fibred, two parts clean sharp sand (fresh-water sand preferable), mixed thoroughly and applied within two hours after mixing.

White coat and sand finish same as for metal lath.

Finishing coat should be applied within 48 hours after first coat is put on.

16th and Harrison Sts. San Francisco, Cal.

Office, Builders' Exchange, 106 Jessie St.
Box 245 Telephone Main 5110

or, Builders' Association, 318 Bush St.
Box 197

The San Francisco Artificial Stone Paving Company

H. L. PETERSEN

Artificial Stone Sidewalks, Concrete Walls, Foundations, Tanks, Reservoirs, Buildings, Etc.

Residence, 717 Treat Avenue *San Francisco, Cal.*

SPECIFY EXTRA HEAVY

H. & H.
READY ROCK ROOFING

FOR BUILDINGS LIKE THIS.

MANUFACTURED BY
PIONEER ROLL PAPER CO.
Los Angeles, Cal.

"H. & H." Building Paper is the BEST.

SUNSET LUMBER COMPANY

SPECIAL BILLS AND CARGOES CUT TO ORDER

C. H. OLINGER, MANAGER

WHOLESALE & RETAIL DEALERS IN

PINE AND REDWOOD LUMBER

MAIN OFFICE & YARD
FIRST & CLAY STS.
OAKLAND

BRANCH YARD
EAST 12TH ST & 17TH AVE.
EAST OAKLAND

HIPOLITO REVERSIBLE WINDOWS

Turn clear around as well as slide up and down, giving easy access to both surfaces. They are extensively used in office buildings and up-to-date homes, where their convenience and simple construction have proved their economy. ¶ We make also the best in Screen Doors and Window Screens. Send for our catalogue and booklet showing Hipolito Windows in use.

HIPOLITO SCREEN & SASH CO.
(INCORPORATED)
634-638 Maple Avenue, Los Angeles, Cal.
'Phones: - - Home 5190, Sunset 1806

Frank L. Hoyt — Henry A. Hoyt

HOYT BROTHERS

Contractors and Builders

Cottages, Suburban Homes and Out-of-town Contracts our Specialties. Houses Designed and Plans Draughted for Prospective Builders. We make a specialty of taking contracts, anywhere in California. We are prepared to give estimates on short notice on work of any character, summer resort bungalows, country residences and barns, hotels at resorts, etc., etc.

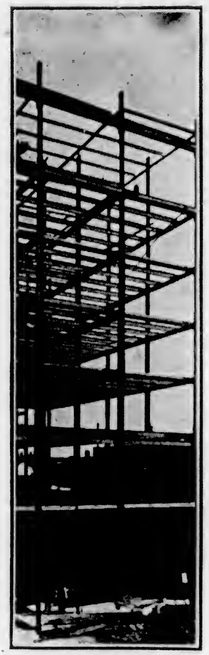
We take pleasure in corresponding with intending builders and architects anywhere on the coast relative to building.

SANTA ROSA, CALIFORNIA

Bay City Iron Works

Boilers, Tanks, Sheet Iron, Structural Iron and Steel Work, Blacksmith Work of all Descriptions, Concrete Cars, Ore Cars, Coal Cars, Buckets of all Descriptions.

136-138 MAIN ST.
SAN FRANCISCO, CAL.



Steel Frames for Fireproof Buildings

Architectural and Ornamental Iron Work of All Descriptions.

RalstonIron Works, (Inc.)
222-224 Howard St.,
San Francisco

F. STOESSER — A. A. DEVOTO

Central Iron Works

Contractors for Structural Iron and Steel

WROUGHT AND CAST IRON STAIRS, FIRE ESCAPES, ETC.

PHONE MISSION 377

631 to 651 Florida Street
SAN FRANCISCO, CAL.

J. F. SIMS, Pres. — W. B. MORRIS, Vice-Pres. — L. J. GATES, Secy.

WESTERN IRON WORKS
(INCORPORATED)

STRUCTURAL IRON AND STEEL CONTRACTORS

Gas Holders, Vault Linings, Jails, Etc. Beams, Channels, Angles and Steel Wheelbarrows Carried in Stock.

TELEPHONE MAIN 737

123-125 Beale Street and 120, 122, 124 Main Street, SAN FRANCISCO, CAL.

THE PENNSYLVANIA STEEL CO.
STEELTON, PA.

ALL STRUCTURES OF STEEL AND IRON

BRIDGES, BUILDINGS, ETC.

PACIFIC COAST SALES OFFICE:

308 MARKET STREET, Room 18 - SAN FRANCISCO, CAL.

The Architect and Engineer Of California

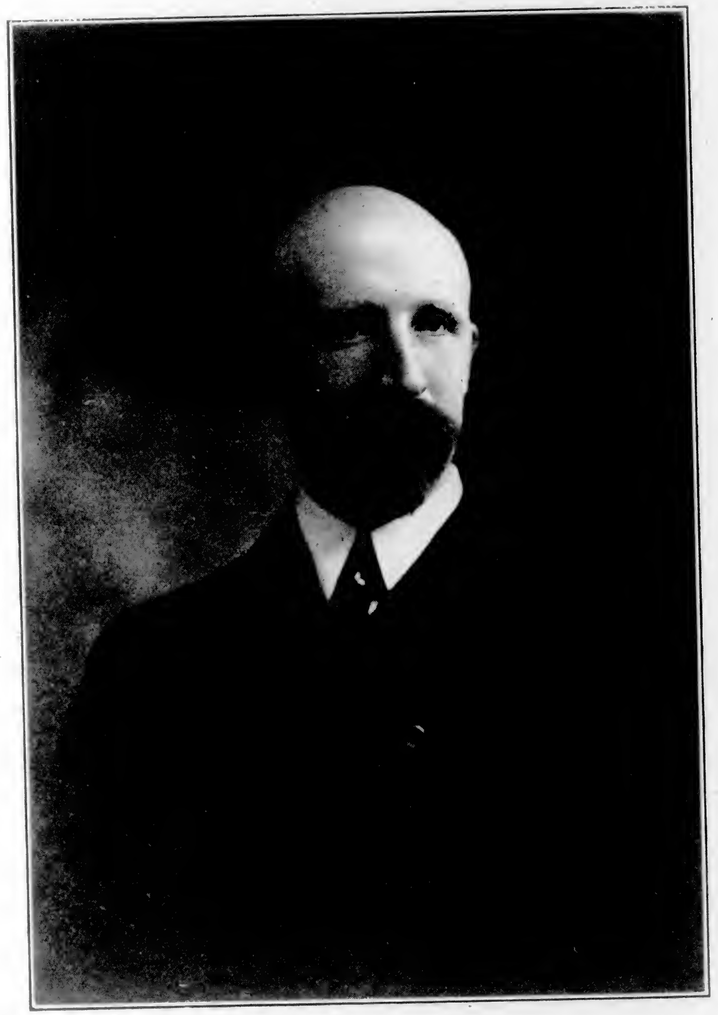
Issued monthly in the interests of the Architects, Constructing Engineers and Contractors, and the Allied Trades of the Pacific Coast.

Terms of subscription, $1.00 per year.

Single Copies, Fifteen Cents.

Offices { 215 Sansome Street, San Francisco, Cal., Telephone Davis 945.
142 S. Broadway, Los Angeles, Telephone Home 5747.

Contents for February



Mr. John Parkinson, Architect

C-347

The Architect and Engineer
Of California

VOL. IV FEBRUARY, 1906. NO. 1

The Dream of the City

Being a Fable for the Property Owners of San Francisco

By ARTHUR O. JOHNSON

SAN FRANCISCO has been sleeping a long time, but now she is awake. While sleeping she dreamed that she was California's favored child, for her home had a Golden Gate, and in her garden, smiled on by sunny skies the year round, grew the most beautiful flowers in the world. Her garden's edge was washed by a grand ocean that spread its waters as far as the eye could reach into the Western distance. When wild winds tossed the seas, the hills of her vast estate sheltered the harbor wherein her boys' ships lay at anchor, discharging the large cargoes of Oriental goods that she would sell to her less fortunate sisters.

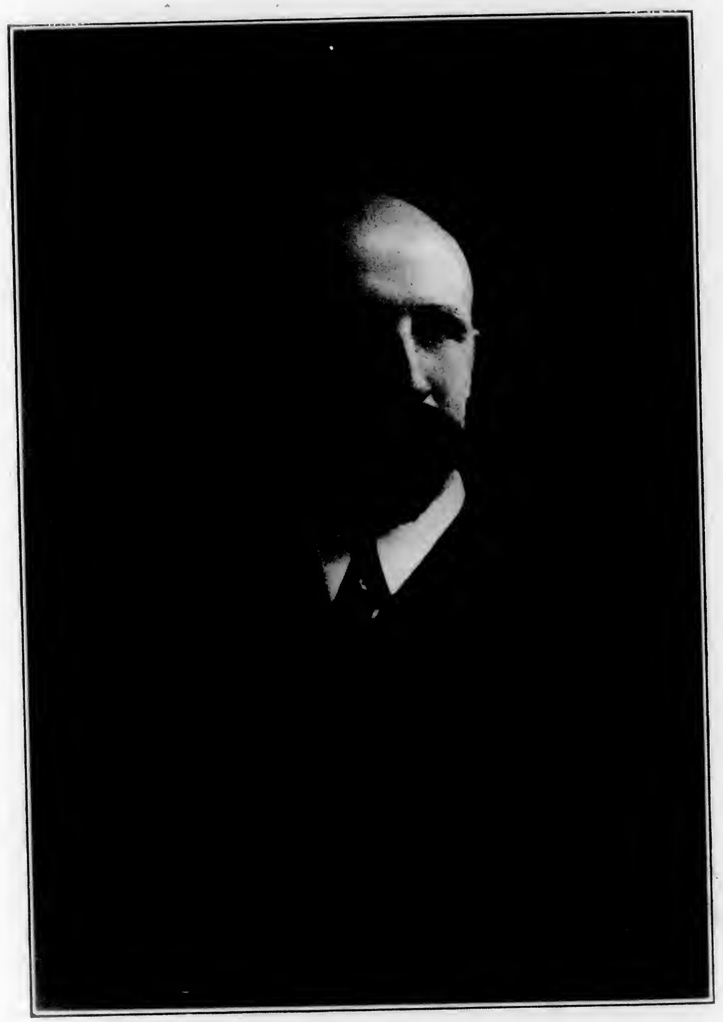
Her wealth had grown to such an enormous size that she became lazy and exorbitant, so much so that the plain Seattle girl, taking a mean advantage, taught her boys to build ships and stole a good bit of the world's commerce from her.

Then that beautiful Los Angeles woman, by cultivating her gardens had made them world famous, and by spending all her money on ornaments had made herself so attractive that people liked her and came from all over the world to buy portions of her estate and erect houses thereon.

Dreaming of her rivals made San Francisco so jealous that she tossed and fretted until she awoke to see standing before her the Goddess of Art, her hand raised as a signal that she wished to speak.

"My child," she began, "not many years ago you were young, uncouth and smacked of the village. Rough men danced and flirted with you; in their homely way they paid you compliments; they were wild adventurers, however, and cared more for your mother's gold than for your looks. What these men wanted was wealth, and their greed for it made them forget to buy you ornaments; consequently you grew up a neglected girl.

"Nature was kind to you in the beginning, giving you a good form and surroundings and sheltering you from the wild and rough storms that other and less fortunate children must endure.



Mr. John Parkinson, Architect C-347

The Architect and Engineer
Of California

VOL. IV FEBRUARY, 1906. NO. 1

The Dream of the City

Being a Fable for the Property Owners of San Francisco

By ARTHUR O. JOHNSON

SAN FRANCISCO has been sleeping a long time, but now she is awake. While sleeping she dreamed that she was California's favored child, for her home had a Golden Gate, and in her garden, smiled on by sunny skies the year round, grew the most beautiful flowers in the world. Her garden's edge was washed by a grand ocean that spread its waters as far as the eye could reach into the Western distance. When wild winds tossed the seas, the hills of her vast estate sheltered the harbor wherein her boys' ships lay at anchor, discharging the large cargoes of Oriental goods that she would sell to her less fortunate sisters.

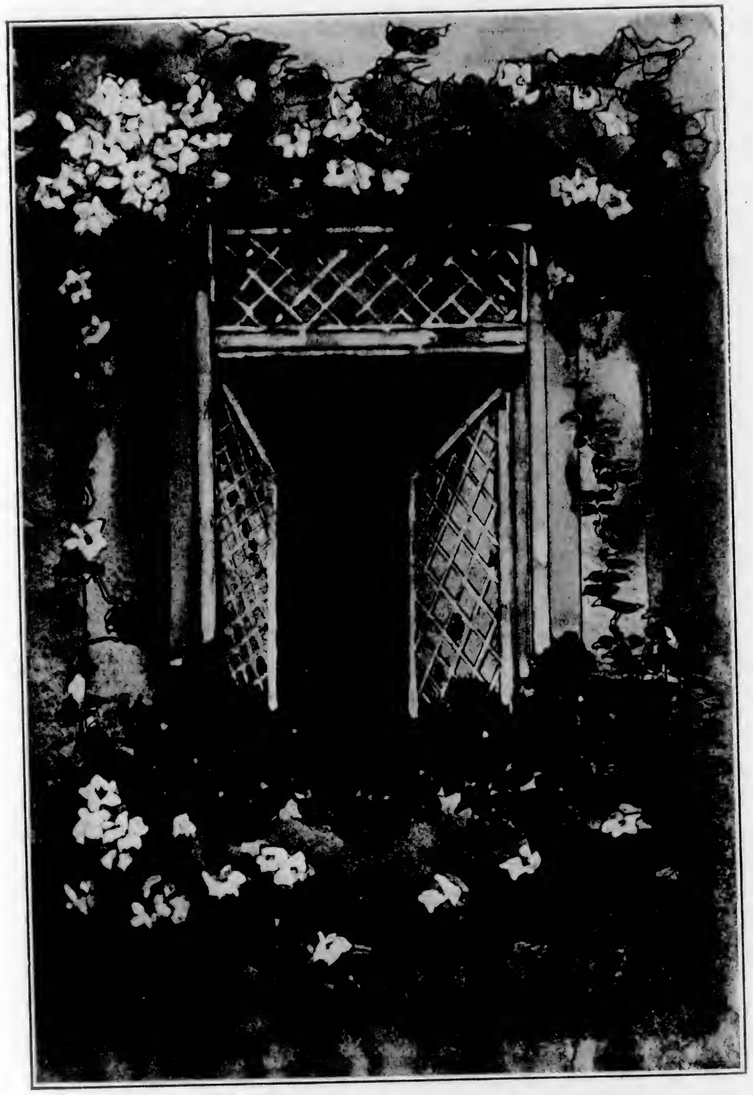
Her wealth had grown to such an enormous size that she became lazy and exorbitant, so much so that the plain Seattle girl, taking a mean advantage, taught her boys to build ships and stole a good bit of the world's commerce from her.

Then that beautiful Los Angeles woman, by cultivating her gardens had made them world famous, and by spending all her money on ornaments had made herself so attractive that people liked her and came from all over the world to buy portions of her estate and erect houses thereon.

Dreaming of her rivals made San Francisco so jealous that she tossed and fretted until she awoke to see standing before her the Goddess of Art, her hand raised as a signal that she wished to speak.

"My child," she began, "not many years ago you were young, uncouth and smacked of the village. Rough men danced and flirted with you; in their homely way they paid you compliments; they were wild adventurers, however, and cared more for your mother's gold than for your looks. What these men wanted was wealth, and their greed for it made them forget to buy you ornaments; consequently you grew up a neglected girl.

"Nature was kind to you in the beginning, giving you a good form and surroundings and sheltering you from the wild and rough storms that other and less fortunate children must endure.

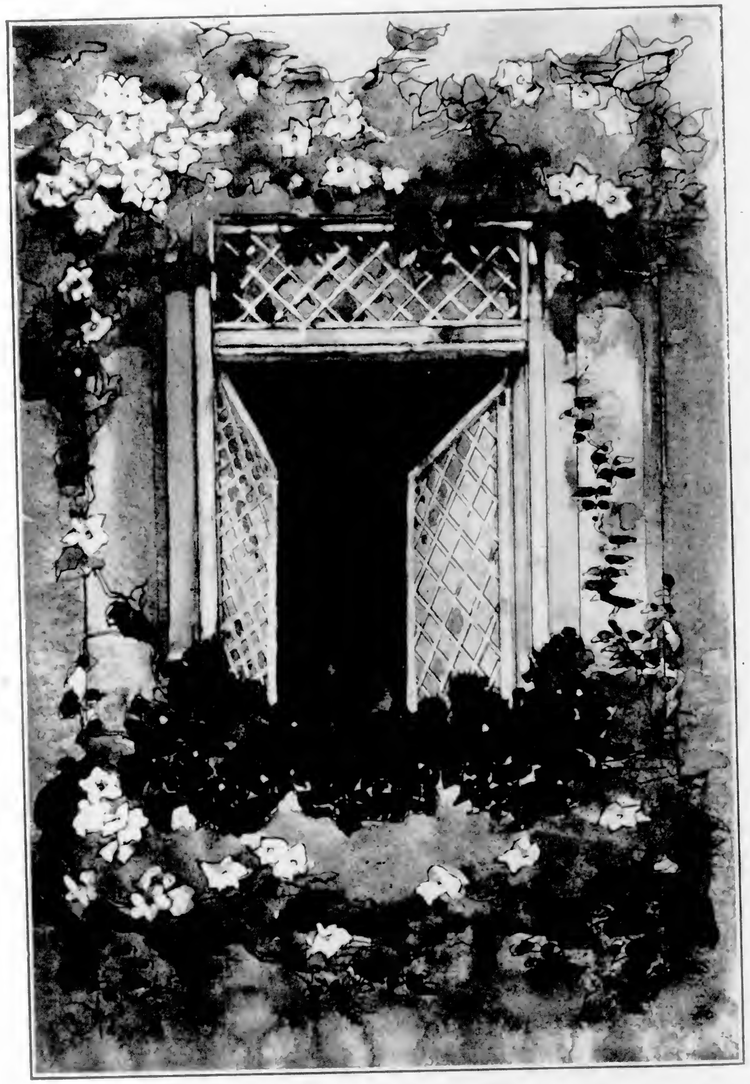


Window-Box Treatment *From Drawing by Edward H. Bennett* C-316

The Window-box should be framed with a vine if possible, the box hidden by foliage.

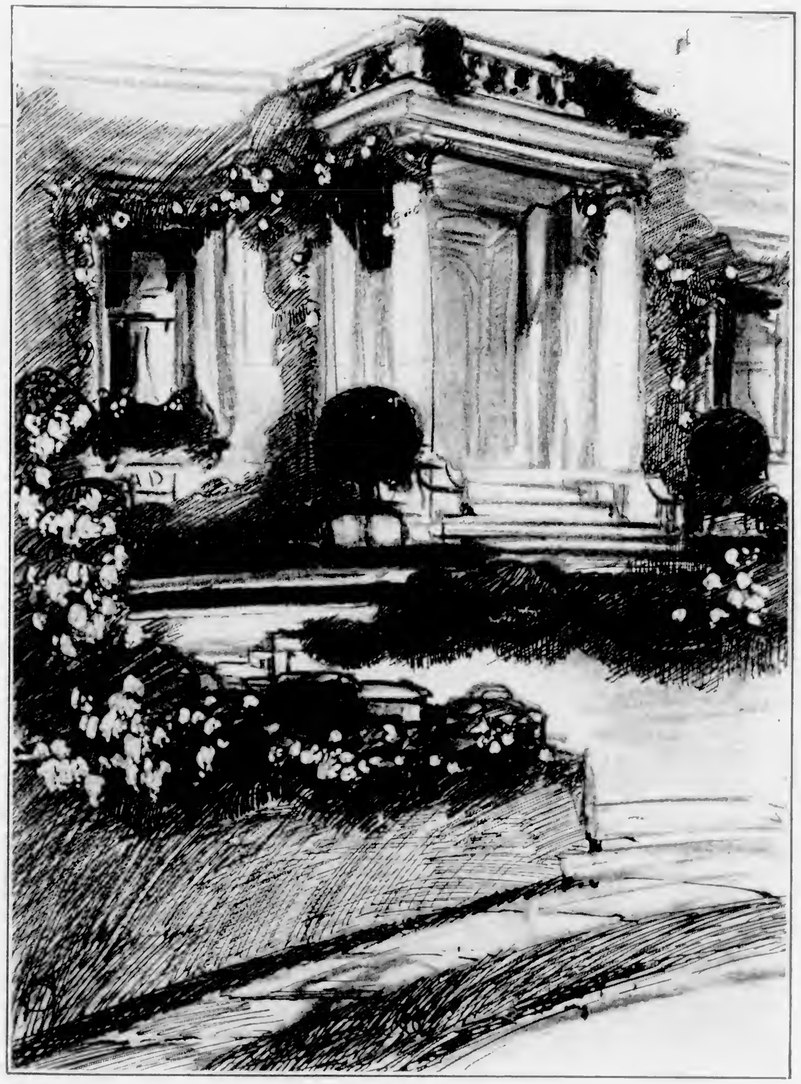
Floral Treatment of House Front *From Drawing by Edward H. Bennett* C-317

Showing Front Garden, Window-Box and Balcony



Window-Box Treatment — *From Drawing by Edward H. Bennett* C-316

The Window-box should be framed with a vine if possible, the box hidden by foliage.



Floral Treatment of House Front — *From Drawing by Edward H. Bennett* C-317

Showing Front Garden, Window-Box and Balcony

"When your first children came the rush and whirl of finding work and homes for all of them pushed culture into a dark corner, where it lay forgotten until your grandchildren's need of an education brought it before their parents' eyes. Culture would not budge from its hiding place, however, until you had built schools (rough schools they were at first, too); but they paved the way for the magnificent ones you are now erecting.

"Your reputation is now established throughout the world for the size of your family; but what good is that? Let me tell you, your family has brought you wealth and respect; now make them bring you admiration. Make your children bedeck you with ornaments that will set off your form to its best advantage. These, with the culture and wealth you now have, will bring you the lasting admiration you crave.

"You must attract men to you so that they will buy and settle on your estate; this cannot be accomplished by remaining plain. You probably remember how my sister Pandora used to bedeck herself that she might beguile men to her, only to send them away with ills and troubles. Follow her example, but distribute sunshine and wealth to your admirers."

The Goddess paused in her talk and reached for a chair; as she seated herself she asked: "Have you been doing anything lately toward beautifying yourself?"

"I have a few children who think of me," San Francisco replied, in a reflective tone. "These children have organized into clubs and have agreed to make my improvement their life's work. I am proud of all of them, for the work they have accomplished is wonderful, especially when you think of the obstacles they had to overcome.

"The Merchants' Association is my chief pride, for its members were the first to think of beautifying me. For eleven years now they have toiled in my behalf.

"You, as the Goddess of Art, would probably frown on street cleaning as not being artistic, but I say that to beautify is an art, and surely the cleaning of streets is beautifying them.

"About ten years ago the Merchants' Association established my present street-cleaning system, and followed it with a street-sprinkling system that keeps the dust from flying in my sons' and daughters' eyes on windy days. Then they were the means of having my streets studded with brilliant electric lights. Before these came, dark and lonely places were given a ghastly hue by feeble gas lamps. Darkness breeds vice and vice destroys beauty. So these sons made beauty possible by placing electric lights where they would shed a brilliancy that could only be rivaled by the sun.

"They secured better pavements for my streets, so that man and beast would have an easier walk than the old style cobble stones afforded them.

"They removed the overhead wires from my business district, and the objectionable projecting signs that used to be so conspicuous along the principal thoroughfares.

"Then they built an ornamental safety station at my principal street crossing, where every day, as they rushed for a car, my daughters' lives were being endangered by the numerous passing teams.

"In one of my parks they constructed a convenience station, and made it attractive by planting shrubbery around its entrances. My children have shown their appreciation by duplicating these stations in other portions of the municipality.

"Just at present they are engaged in trying to improve the car system so that transportation to the outlying districts of my large estate will be quickened. This will cause the building of good houses in what is now thinly

populated districts and prevent my sons emigrating to surrounding estates not in my possession.

"The Merchants' Association does all within its power to bring homes to my estate; when homes are gained she stops and lets the Adornment Association step in to beautify them.

"The last-named association is an organization of representative sons who are trying to promote the beautifying of the streets, public buildings, parks and squares. They try to create a sentiment of civic pride in my sons, so that they will improve their private property, making the estate a more agreeable place in which to live.

"They have employed an architect of world-wide reputation to draft a plan that will be a guide to my sons in laying out new parks and extending the old ones; to establish new grades and new roads in, around and out of my municipality, so that the hills and suburbs will be easier of access; a plan that would show them how to group future public buildings, and that would make this the most beautiful estate in the world. They have the plan, and to tell you of its success would be only a repetition of what you have already heard.

"Through the efforts of this association property has been acquired for a new park in the Mission District and a large portion of the property required to connect Golden Gate Park with the Presidio.

"I am assured that a stately public library will soon adorn my estate, because a large portion of the site selected has been secured.

"Years ago my boys voted bonds to purchase the land necessary to extend the Golden Gate Panhandle to Van Ness avenue; but, because a new charter went into effect a few months later, a High Court decided that proceedings begun under the old law could not be completed under the new.

"This establishes the fact that bonds voted at the present time would be legal, and I hope to see this great work accomplished in the near future.

"It is a fact to be deplored that my children build houses and place them out on the sidewalk line. This is done, I presume, so that their neighbors will not cut off their view up and down the street. They do not stop to think that a view of the street through a vista of shrubbery and bright flowers would be far more delightful and cheering to them, to say nothing of its effect on the eye of the passing traveler.

"I have wished so much that my older and established children would follow the work of the before-mentioned organizations and beautify their individual property as the clubs improve my estate.

"I appreciate the work of architects when they design an ornate or stately building; but I commend both the owner and the architect when the building is set back from the lot line, making possible a garden front. Of course, I realize that in some places land is too valuable, so that setting away from the lot line is impracticable. Land is never so valuable as to affect a flower shelf's cost, however; and as I rarely see one of these, I have come to the conclusion that the majority of my children do not care to see me becomingly garbed.

"I have provided nice parks in all parts of my estate, so that the children can enjoy the fresh air and rest their tired bodies on a bench or the cool, refreshing grass.

"The laying out of these parks was left to caretakers or gardeners, and they have adorned the smaller ones with trees and shrubbery. Flowers are rare because some people with no appreciation for the beautiful destroy them.

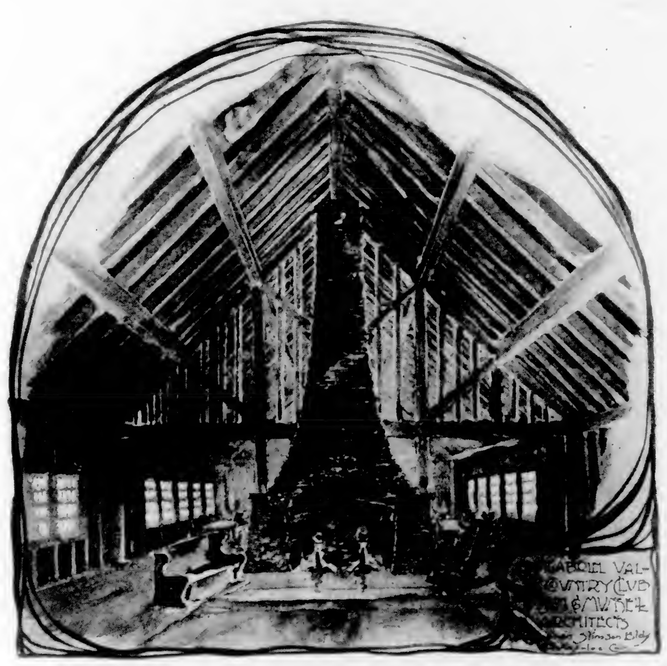
"Golden Gate Park, the largest one that I own, is famed the world over for its winding and tree-lined drives that take you from a sun-baked street to the cool breezes of the ocean; its ever-blooming flowers, the statues that

greet you with silent majesty as you turn from a tree-shaded corner, its conservatory of tropical plants, its deer and buffalo paddocks and its aviary.

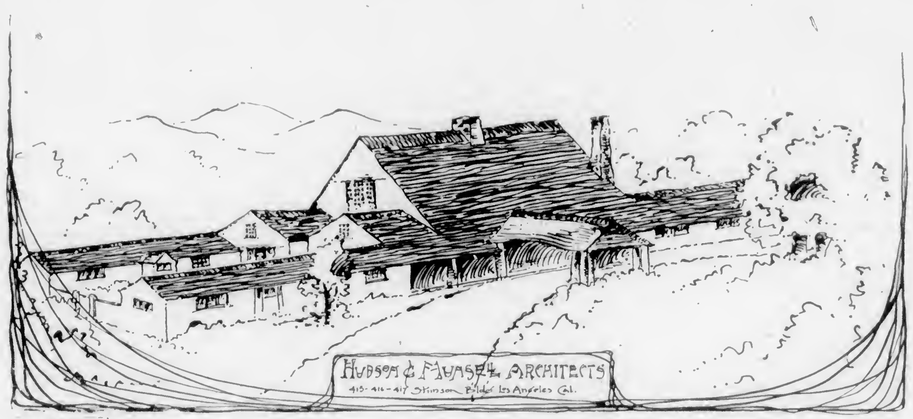
"Out on the Pacific Heights my more fortunate children are building grand houses and laying out gardens which show they at least have cultivated the civic pride so much desired for others by the Adornment Association.

"The Adornment Association's work will soon show itself in a fine Bay Shore Boulevard below the Pacific Heights and along the north shore. The marine view obtained from such a boulevard could be equalled by no other city in the world. It will also try to improve my ocean boulevard, to build an opera house, auditorium, art gallery, aquarium and an observatory on some prominent hill, say, for instance, Buena Vista Park on Haight street.

"As far as my public places are concerned, their beauty is assured. My one great hope is that my children will improve in their artistic tastes and beautify their homes. I think this will be accomplished in a few years, so, in bidding you farewell, my dear Goddess, I will extend an invitation to call again in the near future; now that you have opened my eyes, I can promise you some wonderful results."



Lounging Room, San Gabriel Valley Country Club — *Hudson & Munsell, Architects* C-318



San Gabriel Valley Country Club — *Hudson & Munsell, Architects* C-319

A Clever Country Club House

By WILLIAM KNOWLES, Architect

THE solution of the problem to embrace important requirements in a country club, both social and athletic, appears to have been solved in a very clever manner by Messrs. Hudson & Munsell, architects, of Los Angeles. The generous, low and spreading porches planned by this firm in sketches of the San Gabriel Valley Country Club, at once give a welcoming effect to the club's members and visitors. The spacious lounging-room and dining-room are divided by an immense chimney—a treatment that is both unusual and effective.

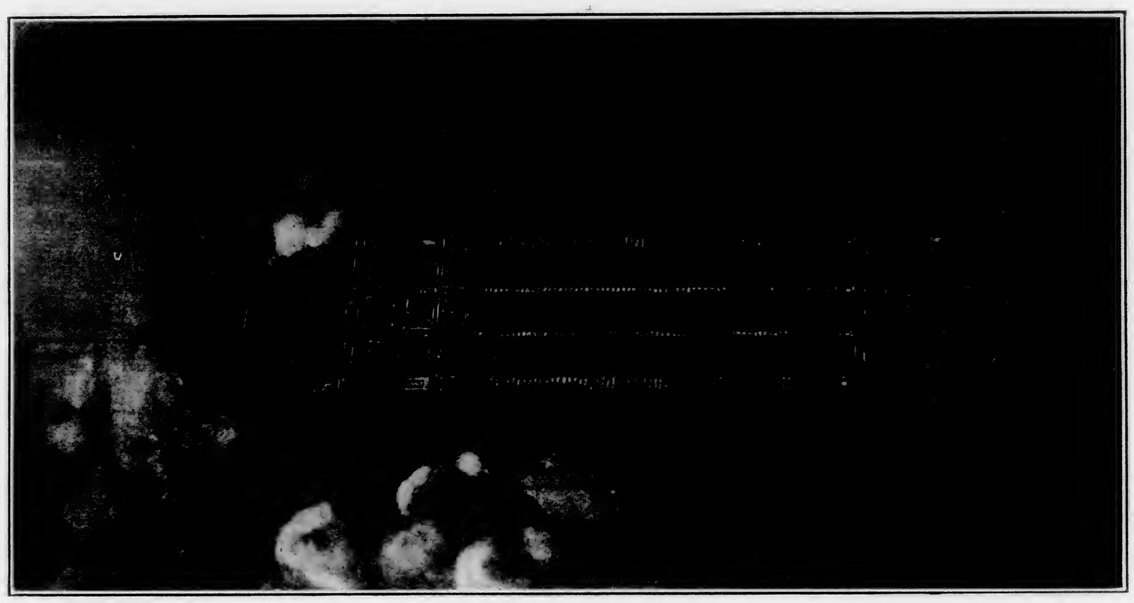
The ceiling, with its simple trusses exposed, adds greatly to the charm of these two rooms and affords an abundance of good air. The kitchen, servants' quarters and pantry are well placed and well equipped. The buffet also is fortunate in its position, being next to the billiard room and den and removed from the dining room and lounging room.

That portion of the building devoted to athletics is in two remote wings, although easily accessible from the main building. The entrance to the ladies' lockers is well planned, being screened by a small vestibule, which leads into a delightful, sunny sitting room. Off this we have the lavatories. Then come the alcove dressing-rooms and lockers. As the gentlemen were more favored in the main building regarding minor comforts, their locker rooms have not some of the accessories that the ladies possess; in fact, the space is taken up entirely for lockers and lavatories.

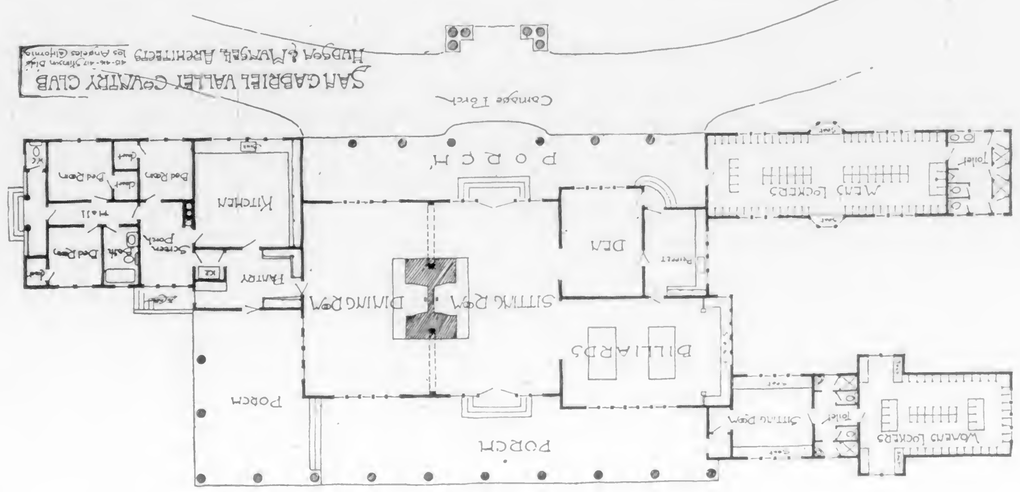
The perspective shows a clever handling of the roof line, the long horizontal lines predominate and give the effect of the low, restful, quiet country life. The roof over the two locker wings is nicely brought into the main roof with two minor small gables, which also have their ridges running in the same direction. The simple, clean sweep of all these parallel lines make an unusually simple but pleasing composition.

❖ ❖ ❖

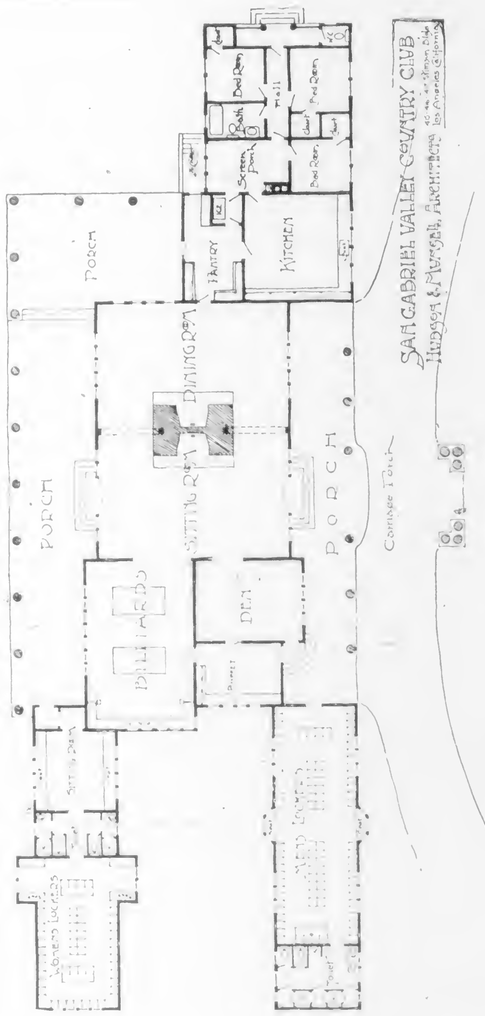
If some men were paid only for what they know they would never possess more than thirty cents.



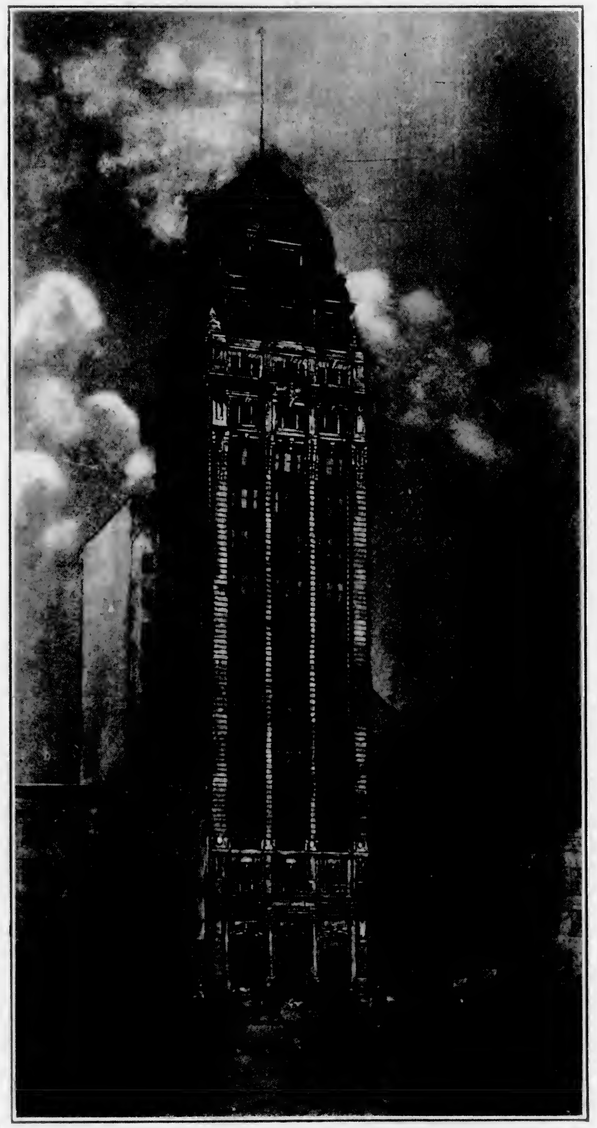
Humboldt Savings Bank, San Francisco — *Meyer & O'Brien, Architects* C-348



Floor Plan, San Gabriel Valley Country Club — *Hudson & Mansell, Architects* C-320



Floor Plan, San Gabriel Valley Country Club *Hudson & Munsell, Architects* C-320



Humboldt Savings Bank, San Francisco *Meyer & O'Brien, Architects* C-348

The House of Senator W. A. Clark C-822

The House of Senator Clark—An Architectural Aberration

A CASUAL criticism in a weekly paper not long ago observed that the Clark house, which has been standing unfinished so long and inviting speculation at the corner of Fifth avenue and Seventy-seventh street, would have been an appropriate residence for the late P. T. Barnum. Therein the casual critic criticised better than he knew, for thereby hangs a tale. Barnum did build a house. In fact he built two. But the later, "Waldmere," was a decent and inoffensive villa, such as any prosperous Bridgeporter might have erected for himself at the date of its erection without exciting wonder. Its predecessor, "Iranistan," was distinctly projected as an advertisement, and an adjunct to the "show" business, in the interest of which the owner trotted out an elephant to plow his grounds in sight of the New York and New Haven trains, as often as these went by. This ostentatious addiction of the elephant to agricultural pursuits elicited letters to the owner, inquiring about the animal's utility, and in particular how much he could draw, whereto the genial old humbug was accustomed to make answer that he calculated the plow-elephant would draw twenty thousand people to the show! But that is another story. The story of the house is that Barnum's agent went to an architect in New York, then young and struggling, now aged and eminent, and explained his principal's desires. The architect, in whose professional equipment a sense of humor was included, saw at once what the showman desired, and hilariously determined to give it to him.

In Xanadu did Kubla Khan
A stately pleasure dome decree.

Taking his cue from the name he projected an Oriental pipe dream of a sham palace, breaking out at top into an extravaganza of towers and domes in lath. The client was enchanted when the agent showed him the drawings, and the work proceeded under local superintendence at the site. Years afterwards the architect happened to be in Bridgeport, and took an excursion to the result of his own machinations. According to his own report, he found it ridiculous beyond his most sanguine hopes and the Mephistopheles within him suggested a call. The door was opened by the showman himself, to whom the stranger explained that he had been struck by the beauty of the edifice and desired to know the name of the architect. True to his professional instincts the showman declared that the design of the house had been the subject of an international competition, and that he had paid $10,000 for architects' fees. At that—"No, you didn't," broke out the indignant visitor, and with characteristic quickness the showman rejoined, "Is your name ——?" (which it was)—"Come in."

That was the day of small things. Certainly the owner of this latest piece of showman's architecture has not gotten off for the figure to which the Barnumic imagination stretched his expenditure for architecture. The commission has served to split an American firm of architects into its constituent atoms, and to "compromise" an eminent French architect. The general belief has been that it was the eminent M. Deglane who sold the gold brick to the Copper King, and that all the "Johnny-on-the-spot," if we may use so cheap an expression about so expensive a work, had to do was to superintend the execution of the imported and imposed design. A recent statement, however, which has the air of authenticity, from the local architect, explains that this

The House of Senator W. A. Clark C-322

The House of Senator Clark—An Architectural Aberration

A CASUAL criticism in a weekly paper not long ago observed that the Clark house, which has been standing unfinished so long and inviting speculation at the corner of Fifth avenue and Seventy-seventh street, would have been an appropriate residence for the late P. T. Barnum. Therein the casual critic criticised better than he knew, for thereby hangs a tale. Barnum did build a house. In fact he built two. But the later, "Waldmere," was a decent and inoffensive villa, such as any prosperous Bridgeporter might have erected for himself at the date of its erection without exciting wonder. Its predecessor, "Iranistan," was distinctly projected as an advertisement, and an adjunct to the "show business, in the interest of which the owner trotted out an elephant to plow his grounds in sight of the New York and New Haven trains, as often as these went by. This ostentatious addiction of the elephant to agricultural pursuits elicited letters to the owner, inquiring about the animal's utility, and in particular how much he could draw, whereto the genial old humbug was accustomed to make answer that he calculated the plow-elephant would draw twenty thousand people to the show! But that is another story. The story of the house is that Barnum's agent went to an architect in New York, then young and struggling, now aged and eminent, and explained his principal's desires. The architect, in whose professional equipment a sense of humor was included, saw at once what the showman desired, and hilariously determined to give it to him.

In Xanadu did Kubla Khan
A stately pleasure dome decree.

Taking his cue from the name he projected an Oriental pipe dream of a sham palace, breaking out at top into an extravaganza of towers and domes in lath. The client was enchanted when the agent showed him the drawings, and the work proceeded under local superintendence at the site. Years afterwards the architect happened to be in Bridgeport, and took an excursion to the result of his own machinations. According to his own report, he found it ridiculous beyond his most sanguine hopes and the Mephistopheles within him suggested a call. The door was opened by the showman himself, to whom the stranger explained that he had been struck by the beauty of the edifice and desired to know the name of the architect. True to his professional instincts the showman declared that the design of the house had been the subject of an international competition, and that he had paid $10,000 for architects' fees. At that—"No, you didn't," broke out the indignant visitor, and with characteristic quickness the showman rejoined, "Is your name ——?" (which it was)—"Come in."

That was the day of small things. Certainly the owner of this latest piece of showman's architecture has not gotten off for the figure to which the Barnumic imagination stretched his expenditure for architecture. The commission has served to split an American firm of architects into its constituent atoms, and to "compromise" an eminent French architect. The general belief has been that it was the eminent M. Deglane who sold the gold brick to the Copper King, and that all the "Johnny-on-the-spot," if we may use so cheap an expression about so expensive a work, had to do was to superintend the execution of the imported and imposed design. A recent statement, however, which has the air of authenticity, from the local architect, explains that this

is not the case, and that the only responsibility M. Deglane had about the actual design was that he "approved" it. To be sure, that responsibility is sufficiently heavy. But we knew already that French artists, sculptors as well as architects, decline to take a very serious view of the artistic requirements of American millionaires. There is a conspicuous piece of sculpture in Brooklyn, modeled by an American, it is true, but evidently under French influence, which bears manifest testimony to this truth. One can almost see the sculptor at work modeling it, amid the plaudits of his French studio-companions, not one of whom would have ventured to propose it for a French municipality, but who encouraged the sculptor to do it for an American municipality by such cries of sympathy and encouragement as "Give it to 'em," "Serves 'em right," or the equivalent of such expressions in Parisian studio-slang, "Epatez les bourgeois" par exemple. Similarly, one must assume that the eminent M. Deglane would not have proposed this structure for a Parisian "particular hotel," although in truth it would be more seemly there than in the surroundings to which it has been transplanted. But that is no reason why he should not have considered that it served the Yankee owner right.

What, of course, strikes everybody first about the house is its huge pretentiousness—what you might call its rocky cheek. It is, as the cheerful Lawson, picking his words with his usual success, calls it, the "biggest, boldest, brassiest example of American domestic architecture. It is true, and the fact is so far unredeeming that it also has great massiveness along with its brassiness, and gives promise of a long endurance. Should its room come to be recognized as better than its company, it will be correspondingly costly to demolish. Possibly the next most costly house on the avenue is that of Mr. Carnegie, designed quite on the opposite and British principle of the avoidance of pretense. The "Steel King" is said to have instructed his architects that he distinctly did not want and would not have "a palace," as he distinctly has not got one. The Copper—or shall we follow Lawson and say Brass—King seems to have instructed his that he did not want and would not have anything else, and they have bettered his instructions. The modesty and retirement of the Carnegie house are emphasized by the ample foreground of reservation behind which the mansion shrinks, an enormously costly expedient for preserving comparative privacy, which is characteristically British in the manner of the British owner who is willing to spend more money to avoid pretensions than it would cost to have them. Nobody would think of calling the resulting homeliness beautiful, but nobody could fail to recognize it as gentlemanlike. It takes a back place and talks in a low tone, while the other, on tiptoe at the building line, and "built to the limit," yells, "Come and look at me!"

"Built to the limit" is not quite true. At the north end of the seventy-five feet frontage on the avenue, at the east end of the two hundred feet or so of frontage on the street, the extremities decline and retreat. But this declension and retreat throw out all the more into the street and the avenue the central mass which they frame, push it forward like an obtrusive umbrella into the public eye. That would be well enough, perhaps, if the motive of the avenue front, the order "distyle in antis," had been merely repeated at the center of the longer front and its plane. That would have resulted really in a colorable imitation of the Faubourg St. Germain, in so far as the hotel of the Faubourg, secluded "entre cour et jardin" can be guessed behind its jealous screen, instead of being turned out naked into the street, with the effect of indecent exposure. This effect is greatly heightened by the bulging of the central feature on the street front, with no discoverable or imaginable motive but to force it more unescapably on the public view. One may protrude a

bay to gain a better and more commanding view for the inmates. But in that case one does not proceed to block up and shut out the view by withdrawing the sides of the bay to the bottoms of reveals as deep as the order, thus nullifying the whole arrangement. It is impossible to attribute to the bulging of the central feature on the long front any more artistic or creditable motive than to obtrude it on public notice.

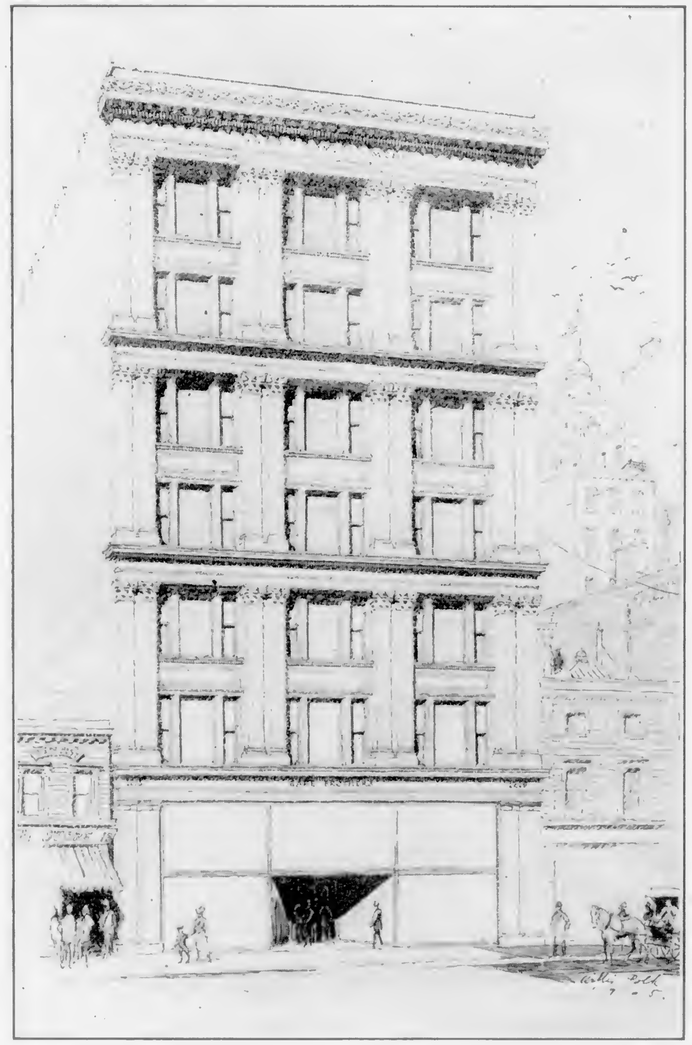
Meanwhile, there is a feature that might be properly protruded, granting the propriety of its existence at all. That is the steeple, belvidere, or what not, two-thirds of the way down the side street. The crowning lantern of this and much of what might be called the belfry stage are visible all over Central Park, and much of the up-town region, where they "advertise mystery and invite speculation" upon what sort of meeting-house can possibly have been of late erected in the region indicated. Nobody could possibly infer from the size, shape or treatment of this crowning member that it denoted a dwelling house. But when one comes near the actual site, the steeple is rendered invisible by being withdrawn, one might almost say modestly, far behind the plane of the front, and left without visible means of support. In fact, instead of the emphatic solid one has the right to expect, if not to demand, as the basis of such an erection, it is represented, in the plane of the front wall, by precisely the largest, and, by reason of its treatment, as well of its dimensions, the weakest void in the whole edifice, the great arched opening which has at its base the ferociously corbelled balcony projected, at a huge cost in stone cutting, most obviously to carry nothing but itself. A more meaningless and fatuous feature than this steeple it would be impossible to find, even in the wildest vagaries of our domestic architecture. It is entirely without architectural relation to anything else in the building. It is devoid of apparent use as of meaning or beauty. No human creature can decently pretend to admire anything about it.

Justice, it is true, requires the admission that the massiveness is apparent as well as real. The angle piers are of unusual breadth and power. The relation of voids and solids gives the sense of openings real framed—a sense which is worth having, perhaps even at the cost of also having interiors gloomily dark which practically require lighting from the outside. The treatment, in the matter of stone cutting, is adapted to promote this sense of massiveness to promote it to a rivalry in this respect with the fortified palazzos of Florence, let alone the degenerate chateaux of the Ludovican period in France. The ferocity of the stone cutting is, in fact, so unmitigated that the basement seems to have had as its prototype rather a log-house than any extant construction of masonry. Justice, again, requires it to be said that the designer appears to know his style. If he everywhere overbloats his detail and exaggerates his scale until the effect is what he might call "gonfle" or "bombe," yet the esteemed M. Deglane, if his approval was limited to deciding that the thing was "grammatical," would probably not have been justified in withholding that approval. Only, there is not a bit of this detail upon which any human creature can pretend, again, to look with pleasure. A certified check to the amount of all this stone carving, hung on the outer wall, would serve every artistic purpose attained by the carving itself. The comment the spectator is moved to make, and must make, is only the comment of Mrs. Carlyle's famous house-maid on the Sistine Madonna: "Lor', Mum. How expensive."

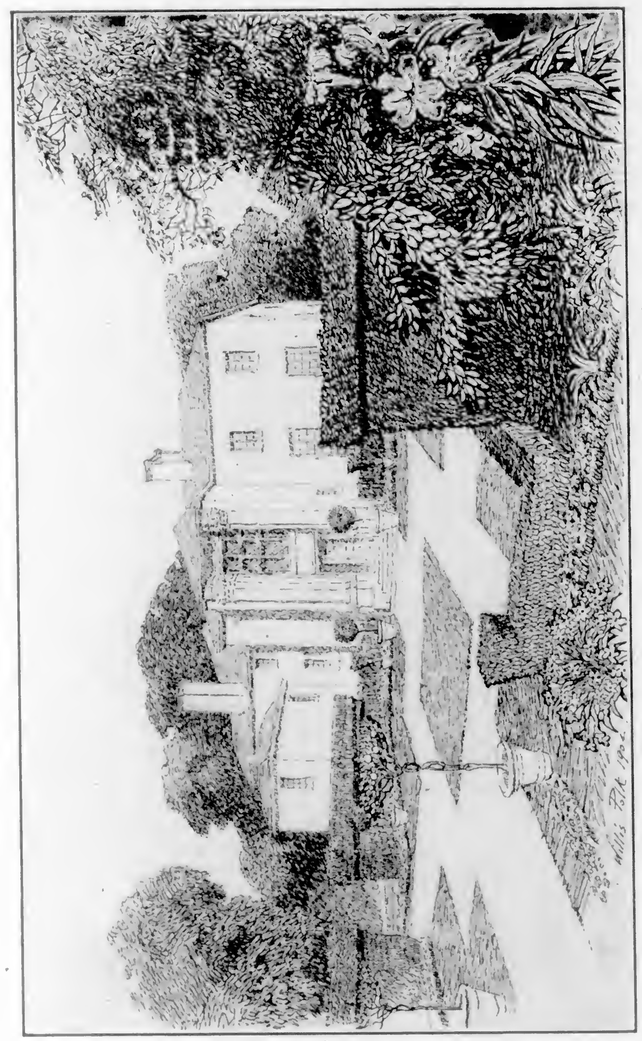
Unfortunately, no degree of vulgarity, of "boldness and brassiness" can make a New York house an "aberration," in the dictionary meaning of "a deviation from the customary structure or type." Or at least it would not have done so a few years ago. But the Copper King and his architect seem unaware that boldness and brassiness are going out of fashion in house build-

ing, and that modesty and a sense of home-like seclusion are coming in. The Clark mansion would have been centrally "in it" half a dozen years ago, when it was projected. But it will be hopelessly "out of it" when it comes to be completed, and antiquated and old-fashioned while it is still brand new. Which will be the most just and severe Nemesis that could possibly overtake an edifice which could at no time have any better claim upon anybody's attention than that it was in the height of the mode.—Architectural Record.

Residence of Mr. James Otis, San Francisco — *Wright & Polk, Architects* C-323



Bare Building, San Francisco — *Wright & Polk, Architects* C-324



Wright & Polk, Architects C-325

Residence at San Mateo

Various Uses of Cement

Extract from Address of President Richard L. Humphrey before National Association Cement Users

IT is my pleasure to address you as President of the Association which was launched so auspiciously at that memorable convention in Indianapolis a year ago. It would appear particularly fitting on the first anniversary of this Association that such an address should dwell on the development in the uses of cement.

It is an old but true saying that "there is nothing new under the sun," and I am taking this opportunity not for the purpose of relating anything new, but merely to refresh your memory on the facts concerning the increasing uses of cement, thereby leading up to the story I hope to be able to tell you tomorrow morning.

The very full programme which had been arranged gives promise of so much interesting information that I shall endeavor to make these remarks as brief as possible.

The use of cement is very old. That the ancient Phoenicians and Egyptians understood the use of mortar is attested by the ruins of their massive masonry structures—the joints of which contained hardened mortar.

It is stated by some writers that there is evidence of the use of mortar as far back as 4350 B. C. That the Romans made use of mortar at an early date is shown by the writings of Vitrivius, but we also learn from Pliny that the mortars were bad, for he tells that "The Cause which makes so many houses fall in Rome resides in the bad quality of the cement."

From the downfall of the Roman Empire to the beginning of the eighteenth century the manufacture of cement seems to have been discontinued. Such cement, mortars and concretes as survived the ravages of the elements had become so hard that Roman cement acquired a reputation for quality which lead the earlier experimenters of the eighteenth century to seek to recover this lost Roman art.

You are all doubtless familiar with the impetus the use of cement received through the experiments of John Smeaton in 1756, by the patent issued to Parker for the manufacturing of Roman cement in 1796, and by the experiments of Vicat and Collet-Descotils.

Portland cement proper, however, did not receive its birth until 1824, when John Aspdin received his patent for manufacturing Portland cement, which he so named from its fancied resemblance to the building stone obtained from the Isle of Portland.

From this date to 1850 very little progress was made in England. In other parts of Europe the development from 1855 was steady and continuous.

Natural cement was first manufactured in the country by Canvas White in 1818 and reached its maximum development in 1899.

It was not until 1872 that American Portland cement was manufactured by David O. Saylor, in Pennsylvania, in an experimental way. Three years later he was able to manufacture it successfully, and our first Portland cement was exhibited at the Centennial Exposition in 1876.

The slow development of this industry was due largely to strong prejudice against the American Portland cement.

The successful introduction of the rotary kiln in 1889-1890 marks the beginning of the rapid and remarkable development both in the production and consumption of American Portland cement. This is very clearly shown diagramatically, the contrast between the capacity of the first cement plant in this country and the modern Portland cement plants having capacities of from 2,000 to 10,000 barrels per diem, is just as great as the contrast between a yearly production of 335,000 barrels in 1890 to the yearly 27,000,000 barrels produced in 1905. And this development is now not confined to one or two points, but is spreading over the entire country.

While it is true that the uses of cement in mortars for binding together masses of masonry or in concretes is very old, its use in the construction of arches, beams, columns and other structural parts is quite recent, and the remarkable development in the diverse uses to which it is put is all within the recollection of the present generation.

These uses may be grouped as follows:

(1) In mortars, binding together large masses of stone or brick, etc., or for casting various forms—artificial stone, hollow block, brick, etc.

(2) As concrete in mass or under conditions where it is only subjected to compressive stresses; and

(3) As reinforced concrete where it is subjected to both tensile and compressive stresses.

For the first part of group 1, it will be sufficient to observe that cement mortar is rapidly replacing lime and natural cement mortar.

The manufacture of artificial stone is now making progress and is successfully competing with cut stone work of ornamental character both in price and quality. In the manufacture of hollow block there has been very unusual development. Indeed, it has been so rapid, and has appeared so attractive as a field for investment that inexperienced persons with insufficient capital and experience in this new business have rushed into the field, and the result has been for poor material which has not be acceptable to the builder, and this has contributed no little towards retarding the development. This class of building has come to stay, and it will only be a question of time when matters will so adjust themselves that first-class material will be uniformly produced and it will form a very desirable substitute for brick and stone, and in cheapness will eventually compete with wood.

The use of cement has been quite general for many years for sidewalk work, and pavements of this character are by all odds the best attainable. The use of concrete for piers, abutments and arched bridges without steel reinforcement is too general to need comment. Additional information, however, is greatly needed as to the proper means for providing for the expansion and contraction of concrete in large masses. The first concrete arch bridge was built in this country in 1870, in Prospect Park, Brooklyn, and to the Erie Railroad is given the credit of having lined the first tunnel with concrete, namely that at Bergen, N. J., in 1874.

A notable development in the use of concrete for bridges is illustrated in the construction of the bridge over Rock Creek in Washington. The voissoirs for the arches of this bridge are molded separately, are then air-hammered, dressed and then hoisted into position. These blocks being handled similar to stone holes being cut for the dogs. The spaces between these rings and the spandrel walls cast in place with concrete. No sand is used in the concrete for the arch ring, the crushed rock screenings being substituted and the bluish of the rock produces a marked contrast to the color of the concrete ones in the spandred walls in which a yellowish sand is used.

Concrete sewers and retaining walls harbor, bulkheads of plain concrete are also so extensively used that they are no longer a matter of special interest.

Reinforced concrete, however, is of more recent development. The use of this form of concrete construction was probably known prior to 1855, for at the Paris Exposition in that year a system of reinforced concrete was exhibited by Lambot. In 1861 Coignet proposed a method of reinforced concrete construction. The first application of metal reinforcement for concrete by Monier was in 1867 in the construction of some very large flower pots. In 1868 Monier obtained his first patent for reinforced concrete, but it was not generally used until after 1880, although in 1879 he again exhibited at the Antwerp Exposition a system of reinforced concrete construction.

The first reinforced concrete construction in this country is credited to W. E. Ward, in 1875, who erected in New York City a house having the floors and columns of reinforced concrete. It should be noted in 1876 Thadeus Hyatt, an American engineer, published his experiments on reinforced concrete in the laboratory of Kirkaldy, London, England. The experimental work of Hyatt extended from 1870 to 1880. The first Ransome patent was taken out in 1882, and it was applied in the construction of his first building in 1884. Between 1891 and 1894 Moeller in Germany, Muensch in Hungary and Melan in Austria were pioneers in the development of reinforced concrete construction in Europe. The use of reinforced concrete on a large scale began in Germany under the system of Moeller in 1893 and Rabits in 1898. Hennebique had built reinforced concrete floors as early as 1879. It was not, however, until 1892 that he obtained a patent for his system of reinforced concrete construction.

The last ten years has seen a very remarkable development and reinforced concrete construction. At first reinforced concrete construction was used largely in the construction of bridges, the first of which was built in this country over the Pennypacker Creek in Philadelphia in 1893, and for which I had the honor of inspecting the cement and other materials as well as construction of this bridge. From this beginning the use of reinforced concrete has developed rapidly, and we find it is used in almost every conceivable form of construction—large sewers, water pipes, reservoirs, coal bunkers, pneumatic dams, chimneys, grain storage bins, bridges, buildings, being some of the many applications.

Experiments have been made in the Reclamation Service for its application in large reinforced concrete pipes of five feet in diameter and capable of standing upwards of 70 pounds in pressure, while one of the most novel and recent applications of reinforced concrete is for reinforced crib work, under the Fraser system, which it is stated costs a little more than timber cribbing, and which has been used extensively in Canada. Chimneys 350 feet in height have also been successfully constructed of reinforced concrete. The Harvard Stadium, the Baseball stand in Cincinnati, and the Stadium of the Washington University at St. Louis are all novel examples of the use of reinforced concrete, while concrete ties reinforced in various ways have been in use for some time, though they have not been satisfactory. The cost of maintenance, however, has been found to be reduced to a nominal sum, and the alignment has been found to be very easily maintained, which greatly offsets the first cost. The rigidity of the roadbed, however, has been a prime objection, and an effort is now being made to introduce an elastic cushion in the tie in order to overcome this objection.

It is in the erection of office buildings of considerable height that the development has been most remarkable. Buildings of eighteen stories in height are being erected in which the skeleton is of reinforced concrete. Considering that the use of steel for reinforcing concrete beams was not suggested until 1882, a development of this character is certainly remarkable, and we

have reason to pause and consider whether such extreme development is wise.

While visiting a large city recently I had occasion to inspect a building of several stories in height in which cinder concrete was being used in the structural parts. The contractor, in reply to my surprised query, stated that the building was still standing. This was indeed true, but what was the margin of safety in this structure? As this concrete had a compressive strength of about half of what could be expected from a fairly good concrete, the factor of safety had therefore been cut in half. In further explanation he stated that in order to compete with other contractors, he was obliged to use the same materials which they did. The use of inferior materials should not be permitted in reinforced concrete construction, and the present situation in the development of concrete and reinforced concrete is one that should be faced squarely. That it is possible to erect a sixteen-story building of reinforced concrete has been demonstrated, but we should have a better knowledge of the properties of this material before such a practice becomes general. Ten years' or less experience with a material in which chemical changes are constantly going on and which may be affected by the changes produced by expansion and contraction is hardly sufficient to enable us to obtain a thorough knowledge of its properties.

The American Society of Civil Engineers recognized the vital importance of this subject and recently appointed a committee on concrete and reinforced concrete with instructions to affiliate itself in its work with similar committee of the American Society for Testing Materials, the American Railway Engineering and Maintenance of Way Association and the Association of American Portland Cement Manufacturers. After over a year's work they have found that—

(1) Thoroughly reliable data upon which they can formulate a report as to the rules and formula to be used in the design of reinforced concrete structures does not exist.

(2) That the results of the tests made in laboratories of the various technological institutions are not sufficiently comparable nor correlated for the purpose of obtaining this data; and

(3) That in order to secure the requisite data it will be necessary to conduct a complete series of tests in one laboratory where the conditions are as uniform as it is practical to obtain them and where the personal equation is reduced to the minimum.

Concrete fills an important and growing field, but it has its weaknesses and its limitations, and this should be pointed out and recognized squarely by its advocates. It is evident to any one who devles into the subject that reliable data for the use in a design of concrete structure is very much needed, and the work of the Joint Committee on Concrete and Reinforced Concrete is doing in co-operation with the United States Geological Survey should receive the encouragement and support of each one present, and I would ask you to use every effort in urging upon your Congressman the vital importance of securing an appropriation for the continuance and completion of this very important work, for the attainment of reliable and uniform data for use in the design of structures in concrete and reinforced concrete will insure a more rapid, safe and successful development in the use of cement.

* * *

Many a man is unable to stand on his dignity because his wife sits on it.

* * *

There would be no labor troubles if every man had a job on Easy street.

The Causes of Failure in the Concrete Block Business*

By O. U. MIRACLE

MR. President and Gentlemen of the National Cement Users Convention: It certainly would be presumptive on my part to assume to tell you all the causes of failure or lack of success in the concrete block industry. Many theories may be found inefficient when put to practical tests, so I shall only treat the subject in the light of my own observations in the field, and shall point out the most glaring dangers which seem to confront us, in order that we may suggest remedies to overcome them.

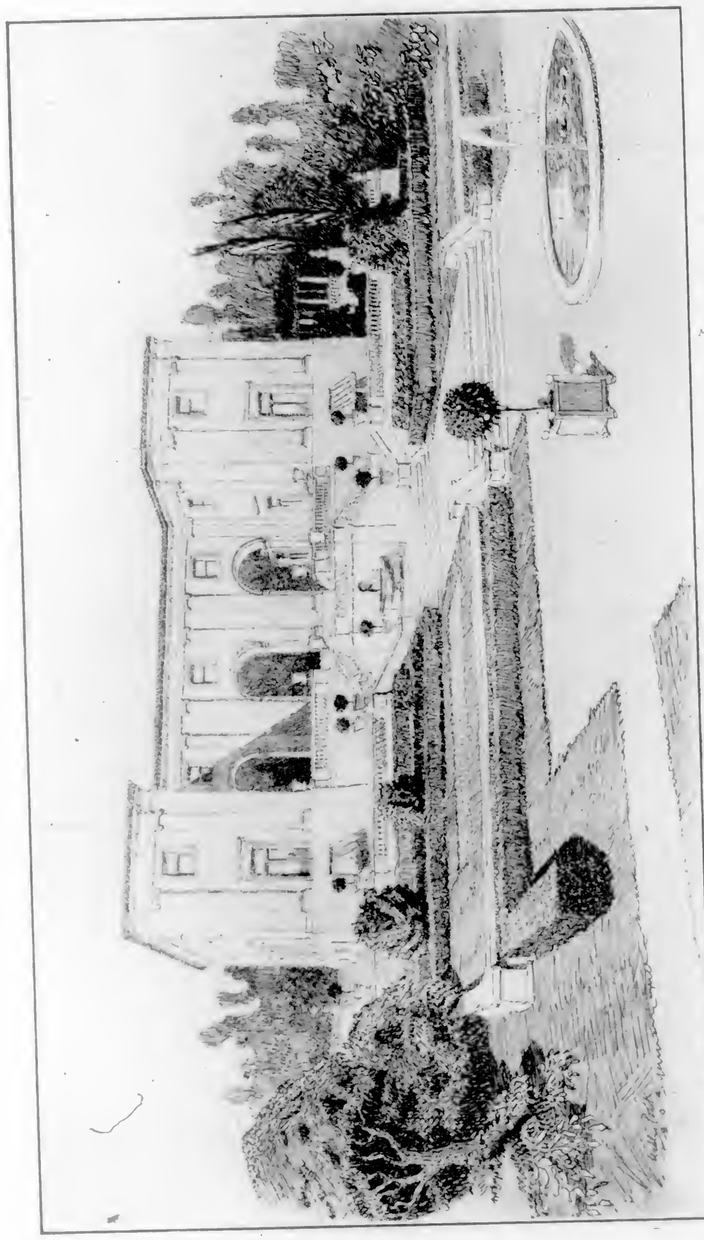
It has been readily acknowledged on every hand that this great new industry has taken on a most wonderful and surprising growth, in fact its strides have far out-reached the fondest hopes of its most ardent advocates. In such a rapid growth, there are bound to be some new points developed and it is certainly well for us to pause at this time to examine the structure we have reared and see if there is any occasion for repairs, or weak points which we may overcome in future work.

That there has been some failures in this business, we must at once admit and it is certainly well for us to view these failures in the glaring limelight of publicity and ascertain if possible the causes in order that the proper remedies may be applied. Some one has said: "It is better to be sure than to be sorry." This is certainly an excellent motto for the Concrete Block Manufacturer. While the financial failures in the business have been comparatively few, the moral failures have been many and the latter are bound to result in financial failures in the end.

So long as a man is human, it will be out of the question to wholly eliminate the moral failures. So long as building material is made and used, there will be difference in the qualities produced, but by the application of the principles and facts already envolved, we can certainly very materially decrease the percentage of failures and not only increase the percentage of success by this gain, but by correspondingly improving the quality and utility of this material, greatly add to the profits of the business.

In looking over the field I find that these failures are due to a great variety of causes. Right here, I want to again remind the manufacturers of Concrete Machinery of the grave responsibility of the position which they occupy in this matter. The field has proven such an interesting one that it has attracted investments by men in all walks of life. Many have engaged in this business whose fund of knowledge on the subject was of necessity limited. They have largely depended on their information upon the literature put out by the various machinery manufacturers. This information has in many cases, either through ignorance of the subject, or a desire to make the proposition look more attractive than it really was, been very misleading, and the instructions given, if followed, would in many cases result in dire disaster. True, this was a new field and we all had much to learn about it, but now that we have progressed far enough into the subject to ascertain certain indisputable facts there is no way of getting away from, I most certainly urge that the machinery manufacturer, in preparing his literature, confine himself to these facts.

* Paper read before the National Cement Users' Association in Milwaukee, January 9th.



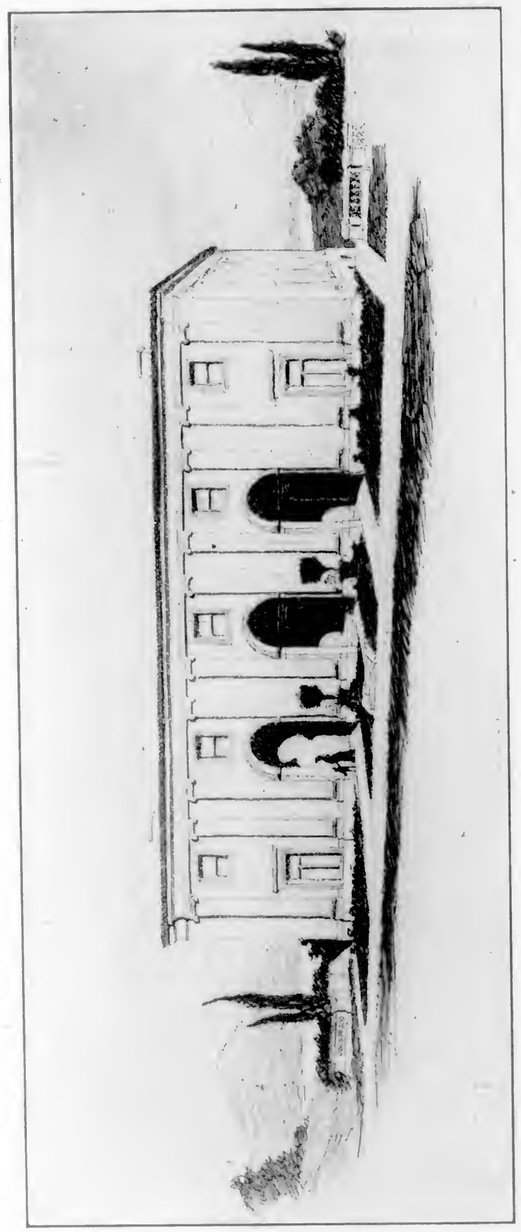
Wright & Polk, Architects C-326

Sketch for Residence

Even in the past few weeks I have seen literature in circulation from what I consider reputable concerns, advertising certain cement block and brick machines, which gave the estimated cost of the manufactured product, at less than the cement alone required to produce a good article, would cost. These figures run too ridiculously low to be worthy of consideration or repetition and indicate mixtures varying from 1 to 6 to 1 to 9 which are far too lean. While on the other hand, a gentleman who claimed to have twenty years' experience in contracting and the use of cement, told me the other day, that he had about made up his mind, to buy a certain type of machine because the manufacturer told him it pressed the blocks so hard that they could be laid in the wall the next day after making. Now with such information as this being dealt out at wholesale by men who are supposed to know what they are talking about, isn't it about time for us to start a little more extensive campaign of education? Isn't it time the public knew more about this great subject? These rash statements often come from the over-zealous salesman, but altogether too often from the machinery manufacturer himself. Their claim of results are often too far out of reason to be reached even under ideal conditions. Gentlemen, I want to urge upon you who are in the machinery manufacturing business that for the sake of the stability and integrity of this great industry, it is important that we unite in doing away with this great evil. Get down to facts and stay there. We are all human and capable of errors, but now that we know better, lets don't commit these same errors over again.

In most all estimates of cost of manufacture, I find that account has been taken only of the direct expense, no mention whatever is made of indirect expense, such as advertising, superintendence, interest on the investment, depreciation, loss from breakage, bad accounts, etc. This is by no means a "get-rich-quick" scheme, but one of the best paying and most legitimate propositions before the investing public to-day, notwithstanding the fact that some of the literature in circulation is painfully strong in having that "get-rich-quick" ring to it. There is sufficient profit in the business to place it on a much higher plan than has been aimed at by many manufacturers. The facts of the matter are, including all these extra items of expense, there is still more chance for gain in this business than in the manufacture or production of any other building material of equal strength and lasting qualities. Up to the present time we have been very lame in the lack of standard specifications for the manufacture of this product. In order to get this matter on a uniform basis, it was brought up at the meeting of the cement block manufacturers held in Chicago, last June and as chairman of a committee appointed for this purpose, I hope to have the pleasure of submitting a progress report, at an early date, and the same will be given due publicity.

While we are on this part of the subject, it may be well to call attention to the fact, that the machinery manufacturers, are not alone to blame for the placing upon the market a poor material. Many who have engaged in this business have made very serious mistakes—mistakes which are expensive, but which can be overcome. Within the past week a case has been brought to my notice, where the party failed absolutely, and his machinery, plant, stock, etc., are now in the hands of the sheriff. This man made serious mistakes and many of them. In the first place he did not attempt to secure any business on merit; he had the idea that he must always be below his competitors to get orders. If the other fellows figures on a job were five hundred or a thousand dollars, he would invariably bid 10 to 25 per cent lower on the jobs he secured.



Wright & Polk, Architects C-327

Sketch for Residence

Under these conditions, what could you expect but inferior material and poor workmanship—in the end a botch job, and worst of all a dissatisfied customer, who uses his influence against cement work at every opportunity.

It therefore comes to us most forcibly that you who are furnishing this product to the public must get together on a basis that will insure uniform product of no uncertain quality, and it will then command the price of which it is worthy. So much for the moral failures.

Then we have the man who goes into business with insufficient capital. Some manufacturer has sold him a machine or partial equipment, simply because he had the price, or a part of it. He gets credit of his local dealer to the extent of the price of a few barrels of cement at a good round price. He makes a few blocks and sells them while they are yet too green for use, in order to get funds for his pressing needs. He discovers, on account of his men being new to business, or for some other reason, that the blocks cost him much more than he anticipated, or twice as much as the over-anxious salesman told him they would. He is short on profits and has already established a selling price at too low a figure. The tendency then is to attempt to make a profit at the already established price by cutting down the amount of cement used and correspondingly increase the amount of sand. The results are too well known. He is down and out in a short time, condemns the business in general, and the machine in particular that he bought, and is not slow to discourage others. By the time the report of his failure gets into about the third or fourth hands, the conditions responsible for the results are lost sight of, and the report is spread broadcast that the business is a fizzle.

Next we come to the architect. He occupies a very important relative position in this matter, and his adverse criticism has no doubt proven a stumbling block to many of you. The value of his opinion and endorsement have been too lightly estimated by many. His position has of necessity been one of great care and caution. He is not willing to depart from fields of well-known practice for the mere novelty of an experiment. His position must be secure. In other words, "He is from Missouri, and has to be shown," but he has been a very careful student of the concrete block; and where a year or two years ago he turned a deaf ear to the proposition, he has discovered now that the material is already established, and he is willing to consider it for his requirements. But it must fill them. His first and most objectionable is, lack of quality. Assure him of this, and he is ready to make a beginning. But he is immediately confronted with the question of appearance and utility. His objection as to the appearance is certainly justified by certain glaring examples. It is lamentable that a material so easily susceptible to artistic designs has been so shamefully treated. Each of you can bring to your own mind a building of concrete blocks, every one of which is exactly the same size, and the same style of rock face design, with no sign of an attempt of ornamentation. There is no legitimate excuse for this neglect, and do you think there is any wonder that Mr. Architect finds fault with the appearance of this kind of building? Certainly not. He can get the same appearance with the cheapest kind of boards covered with still cheaper stamped sheet iron. He wants more variety of designs, and if you will set about it, there is nothing easier than for you to give it to him. True, additional designs means added expense, but you will be placing the business on a higher plane, and your profits will increase correspondingly.

I have visited many yards where the owners were making less than half the designs and sizes of block their outfit was capable of turning out. While it is true there has been a demand for this rock-face block, which you all make, I hope the time will soon come when you will get away from this idea entirely. It is at best but an imitation. As I have said on other occasions, I believe that

this material is entitled to a distinct classification of its own, and a building made of it should be designed as a concrete building, and not as artificial stone, as so many call it.

One of the handsomest buildings I have ever seen of concrete was made of all plain face blocks for the body of the building, with bevel coigns at the corners and openings, with a few ornamental designs utilized as belt course and cornice.

Another just objection of the architect is the extreme prosity or lack of impermeability of many blocks. This, combined with the strength of the material, is the all important part of this proposition, and these objections are being rapidly overcome. This comes properly under the subject of manufacture and specifications, and I shall only touch lightly upon it, as so important a subject is worthy of more lengthy consideration. The results obtained in this direction depend upon the five following vital points:

1st—Proper selection and proportioning of materials.
2d—Careful mixing and complete incorporation of the ingredients.
3rd—Careful and thorough tamping.
4th—Care in curing.
5th—Care in laying.

Proper Selection and Proportions of Materials

Under this subject naturally comes the selection of the cement, sand and aggregates. The cement should in all cases be a first-class Portland, guaranteed to stand the tests required by the specifications for Portland cement, adopted by the American Society for Testing Materials. In the selection of sand and aggregates the greatest care should also be exercised. I maintain that sand should be practically free from clay, loam or other soluble matters, notwithstanding the fact that many tests have shown that a small proportion of clay is not harmful. I believe it to be a very dangerous practice to recommend the use of sand containing any perceptible amount of clay, from the fact that the average worker has no facilities for determining the percentage found in his material. If possible the sand should be graded in sizes, so as to reduce the voids to the smallest possible amount. The percentage of cement used with the sand should be such as to perfectly fill these voids. For determining the voids, the water test may be employed without laboratory facilities.

Average sand is found to contain 25 to 35 per cent voids, indicating the necessity of using this percentage of cement to make a perfect sand cement mortar.

Where aggregates are employed the voids in the aggregate may be determined in the same manner as they are in the sand, and an amount of the sand and cement moisture equal to the amount of voids in the aggregate should be used to make a perfect stone.

Careful Mixing and Complete Incorporation of the Ingredients

Machine mixing is at all times preferable and invariably produces a better concrete by at least 10 to 15 per cent, than can be made by hand mixing. The materials should be thoroughly incorporated and mixed until of uniform color.

When an aggregate is used, the sand and cement should be well mixed first, then the aggregates and water may be added at the same time.

I believe that with any of the machines now on the market a much wider mixture can be used than is generally employed, if proper care is taken of the face plates. The face plates should be kept clean with a wire brush and be given a coat of oil or shellac as frequently as once a day.

Careful and Thorough Tamping

The tamping should commence with the placing of the first shovel full of material in the mold, and should continue until the mold box is full. A small face tamper should be used, and quick, sharp blows should be struck.

Many unsightly buildings have been put up of blocks which showed unevenness in their texture on account of careless and uneven tamping.

Care in Curing

No part of the manufacture of concrete blocks is more important than the curing, and I regret to say that this essential part of the manufacture is altogether too frequently disregarded.

Blocks should be kept moist for at least seven days after making. The water should be applied with a spray or sprinkler immediately after the initial set has taken place, or as soon as it can be applied without washing the stone.

Another fault that I have discovered in this connection is the fact that many yards do not carry sufficient stocks of blocks on hand. They wait until they have secured the contract before making the stone, and they are in this case rushed into the building too green, and bad results will inevitably follow.

No concrete stone made in the manner above described should be laid in the wall until it is at least thirty days of age.

Green blocks should never be exposed to the rays of the sun or warm currents of air during the first seven days, when they are supposed to be kept moist.

I have seen in the early stages of this business blocks made under an open shed, immediately placed out on a hillside, exposed to the sun and wind, with no water applied, except such as was pumped with a common wooden pump and carried in buckets, and you all know too well the results that come from this careless haphazard method.

Is it any wonder that blocks made in this manner are porous, or that they absorb moisture readily?

Many of you have seen buildings of concrete blocks which showed bad cracks in the wall. A building of this material requires just as solid a foundation as though built of any other substance, but in nine cases out of ten where I have found cracked buildings I have found this result came from laying the blocks in the wall too green. They must have at least thirty days in which to cure, and they are better if they are sixty days, or even six months old.

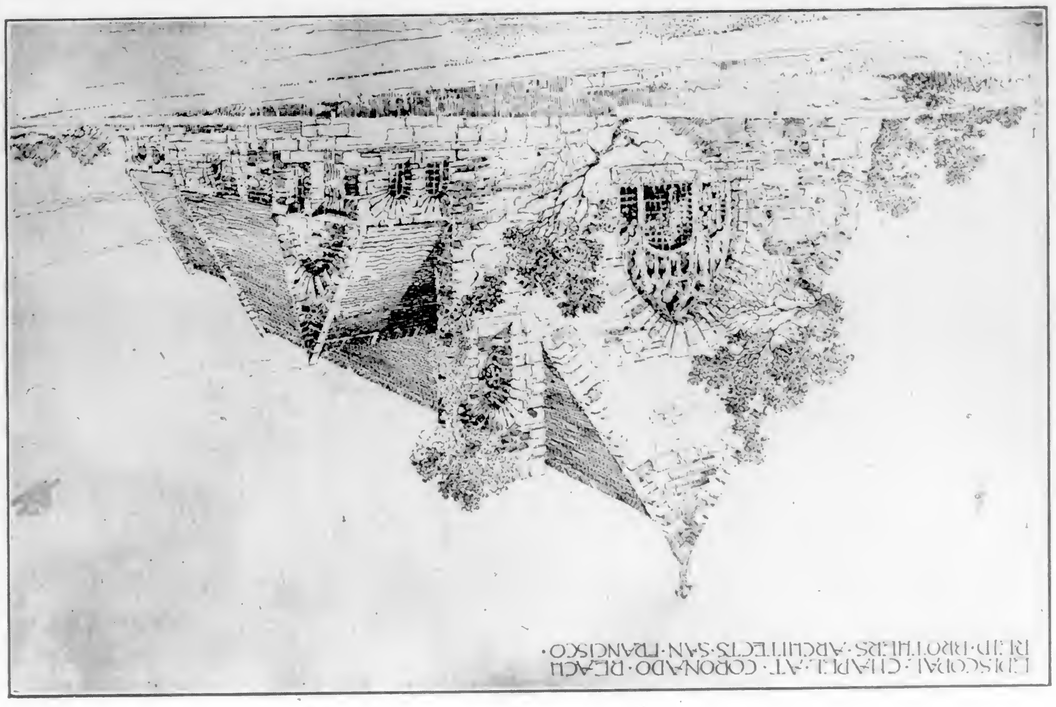
Care in Laying

Too great stress cannot be put upon this important part of the business. A mortar of equal parts of lime and cement to two or three parts of sand should be used, and all blocks carefully bedded and butted on the ends and the joints well pointed up. This pointing should be done at the time of the laying, as if done at some later period the blocks are apt to absorb the moisture from the mortar, thereby loosening it, so that it will drop out.

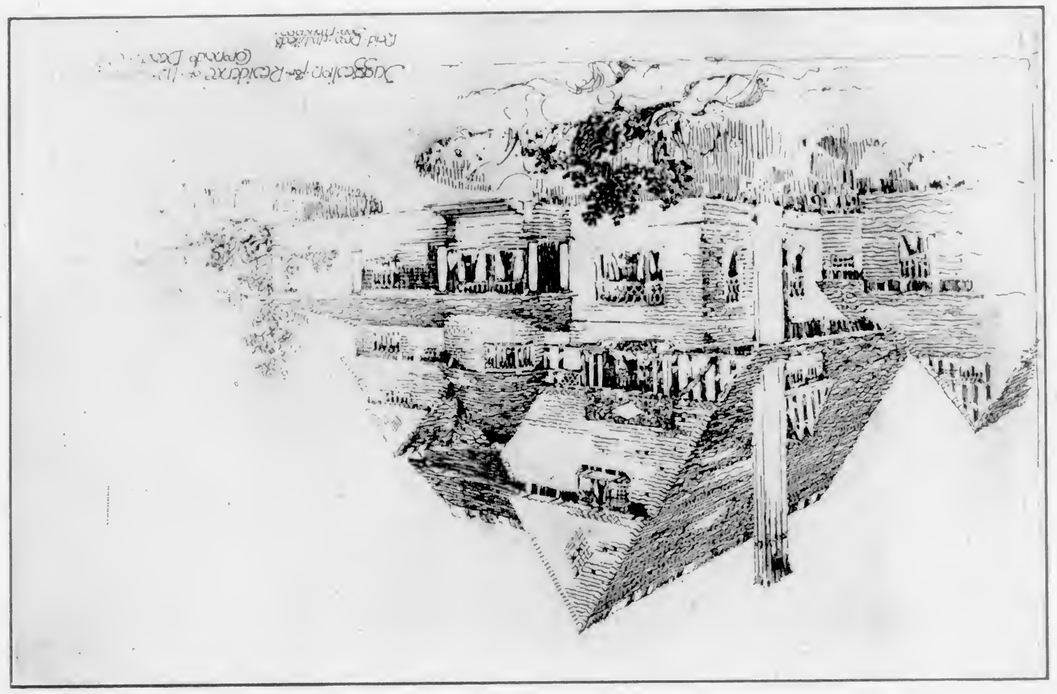
Some blocks are provided with small oval openings at the ends for the reception of a soft cement mortar. After a course of this style of blocks has been laid in a wall the mason should go along the wall with a measure of mortar, sufficiently plastic to pour into these oval openings. This not only insures a tight joint but acts as a dowel to tie the wall.

I have seen many jobs completed which were very unsightly on account of the carelessness of the mason in allowing the blocks to become spattered

C-328



C-329



with the mortar. This can easily be avoided, and I have found it in most cases comes from masons who are prejudiced against the use of concrete blocks.

These subjects will be more carefully discussed in the report of the committee upon Standard Specifications for Concrete blocks, which was appointed by the Cement Block Machine Manufacturers, as above referred to.

Summing up, we find that we have arrived at a very vital and important point in the progress and development of this business—we have arrived at the "Parting of the Ways."

There will be two distinct classes of this material, viz, good and bad—the latter coming from those lacking experience and knowledge of the business; and let us use our united efforts to set them right.

If you have a new competitor in your town go to him and tell him how to make good work, and it will invariably assist in bringing about a uniform and superior quality of concrete blocks.

There will always be some failures, as there are failures in any business, but by united effort and care we can reduce these failures to a minimum and early establish this material in the high class to which it belongs, and our troubles will be reduced to a minimum.

Sketch for an Alta Piedmont Residence *C. W. McCall, Architect* C-330

Reinforced Concrete Tests at the University of California

By CHARLES DERLETH, JR., C. E. Associate Professor Structural Engineering

THROUGHOUT the United States and Europe, during the past decade, the use of concrete as a structural material has been steadily increasing.

Much of this advancement is due to the improvements in the manufacture of Portland cement, and the growth of plants which manufacture that material. Much of the surprising development of concrete structures is due also to the inherent advantages and adaptabiliy of the material.

The combination of concrete with steel produces for certain purposes a material of still further advantages and favor, and it may properly be observed that at the present time, the use of reinforced concrete is becoming so general that it may be considered almost a fad; everybody wishes to use it, whether it be adaptable or not, and sometimes even where it is not so economic as structural steel.

In California during the past few years, reinforced concrete buildings and reinforced concrete arched bridges have been steadily increasing in numbers. Bridges of this type of construction are to be found in many different localities of the State and reinforced buildings, especially in the vicinity of San Francisco and in Southern California are becoming so common that they are no longer a novelty. Los Angeles in particular is favoring to the extreme this method of construction for buildings, and at present some structures of decidedly bold proportions are being built in that city.

The demand for cement in California is now unprecedented and local manufacturers find difficulty in supplying the market. Few tests of concrete and reinforced concrete construction embodying modern reinforcement and fire-proofing principles have been made in this State, and practically none upon large sized members in which local cement has been used. There seems to be much need for tests which will throw light upon the merits of reinforced concrete, using local cements. To fill this need the Civil Engineering Department of the State University has arranged to make the investigations. It is a further significant fact that a number of Engineers and contractors in San Francisco and elsewhere have agreed to assist in the tests and studies. These outside interests are to furnish materials, labor or money for the prosecution of the work upon a respectably large scale.

A special building has just been built upon the Campus, at Berkeley, for housing materials, making test specimens and storing them. All types of deformed bars will be used and also plain bars. The tests will be arranged as far as possible in such a manner and of such proportions of test pieces as to give comparable results that may clearly show the relative merits of different materials and types of design. At least one brand of German cement and one of the Eastern standards will be used besides the Pacific Coast brands which find a market in California. It is intended to use concrete made with German and Eastern states' Portland, merely to give as far as possible, means of comparison with tests made at other places in order to throw light upon the merits of California cement as compared to other brands.

The first tests will be the usual ones for the examination of the individual materials, sand, stone, cement and steel, to determine definitely their mechanical and chemical properties. Adhesion tests, concrete to steel, will be carefully studied.

Of large sized pieces the first will be beams of proportions such as are found in the floors of heavy buildings. It has been decided to test spans of 16 and 20 feet. These studies will be followed by others of slabs and columns. The programme of work may, however, be changed much from the above brief outline as the work progresses.

The Department of Civil Engineering will be greatly indebted if persons, interested in the subject, will offer suggestions or criticisms or help, as the work proceeds. Communications and assistance of any kind will be very welcome and correspondence with the writer is invited and will be appreciated.

The President of the University issued a statement relating to these tests, and that statement is given below:

"Some very important experiments are about to be made by the Department of Civil Engineering of the University of California. Concrete steel construction has become a very important factor in structural engineering work. On the Pacific Coast much of this work is being done. In the past three years a number of reinforced concrete bridges have been built in various localities in California. Reinforced concrete buildings are numerous, especially in San Francisco and Los Angeles. In the latter city, of late, a number of very large buildings are being constructed of concrete-steel of proportions hitherto untried. The Department of Civil Engineering proposes to make a series of strength tests of the various materials used in this style of construction under the direction of Professor Frank Soule and Associate Professor of Structural Engineering, C. Derleth Jr. The demand for cement in California is now unprecedented and local manufacturers find difficulty in supplying the market. These tests of California cements in reinforced concrete-steel work will be the first that have been made in the State and will enable Engineers and Contractors to better appreciate home products in comparison to those of the East and Europe. The proposed tests will supply a real need and the Department of Civil Engineering of the University of California has, during the past year, received many requests for information relating to this very important structural problem. A number of manufacturers and contractors of the State have signified their willingness to furnish to the University free materials and labor for the purpose of making the tests. The Department will treat the subject in a thoroughly scientific manner. It therefore invites anyone to furnish material and labor, or money, or suggestions, to the department. The results will be in all probability published as a Department bulletin and distributed to the citizens of the state for their information. Any one desiring to co-operate with the Department should address Professor C. Derleth, Jr., Associate Professor of Structural Engineering, University of California, Berkeley."

* * *

The Spirit of Art

Nothing so reveals the true life of a people or an epoch as its art. Neither history nor religion offers such a sure test of the heights to which the spirit of an age has risen. View it as you will, art is molded by the forces that environ it, revealing on the one hand the art and soul of its creator, and on the other hand the heart and soul of his age. However much an artist may think himself detached from his surroundings, however passionately he may turn to other ages for inspiration—nay, even though he feels himself gifted with prophetic prescience, and can project himself into ages yet unborn—still he can no more throw aside the mantle of his environment than he can escape the intangible, viewless air which gives him breath and life.—Edwin Wiley.

Cement and Building Construction

By C. A. P. TURNER, M. Am. Soc. C. E.

THE members of the Cement Users Association may with reason congratulate the American Portland Cement Manufacturers on the uniformity and reliability of their product. They have reached this degree of perfection in their cement only by careful study of methods and materials used, combined with systematic tests of the resulting product.

The cement user may well profit by their example and study his methods in the use of cement if he is to produce results at all in keeping with the high grade and possibilities of the material he is using.

In foundation work Portland Concrete is largely replacing footing stones, giving a continuous monolithic construction which where the ground is soft, may be readily and cheaply reinforced with rods and where the conditions are still more unfavorable and piling is used, a concrete cap reinforced has evident advantages over timber.

In placing the material it may not be amiss to suggest to those who expect results without attention and care on their part, that failure to properly mix the materials and depositing the concrete haphazard without consolidating it by tamping and puddling, or allowing mud and sand to flow around the several shovel-fulls or barrel-fulls deposited, will quite likely result in a footing of little more value than one the writer was forced to remove from under a reinforced column carrying five stories. The contractor, who appeared careless to a reckless extent and thoroughly incompetent, rather than dishonest to this extent, stoutly asserted that the mixture was according to specifications and the pier according to plans. When clamps were put on the column and the footing removed, bad cement was the excuse. The idea that bad workmanship and the lack of cement had anything to do with it, seems not to have occurred to him, although in removing the material, a pick could be driven into it half the length of the blade and streaks of sand and clay unmixed with cement could be found in nearly every example.

In exterior walls of concrete, many depend for finish on a plaster coat after the work has hardened up. Wetting the walls thoroughly sometimes enables a sound coat to be applied, though often there is scaling and chipping when the work dries too rapidly. Removal of the forms early, rubbing down all inequalities before the work has hardened and as soon as it has sufficiently set to stand without forms, will obviate this difficulty.

As a cheaper form of construction, cement brick and concrete blocks are coming into use. The general prejudice against this type of construction amongst architects, can readily be accounted for. Too many block manufacturers believe in mixing their concrete 1 cement to 7 or 8 gravel and selling it for a 1 to 3 mixture. Then again through the unfortunate fad of imitating rock faced stone, our concrete block friends must be credited with the production of the most monotonous building material ever placed on the market.

Too little attention seems to be given to artistic effects that should readily be obtained in the manufacture of blocks at a comparatively insignificant increase in cost. The practice of facing with a selected material such as fine white sand or crushed marble or granite with a rich mixture of cement seems to have been done only to a very limited extent, while as a matter of fact, it is practical and comparatively inexpensive. By casting the

faces downward, the facing may be made thin and quite dry and the backing wet enough so that it will supply the necessary moisture to properly crystallize and harden the dryer facing. The object of making the facing dry is, of course, so that it can be removed from the mold without sticking to it and destroying the finished surface, which would be the result using a wet or moist mixture. By a dry mixture, the writer does not refer to one which is mixed without water, but to one that is not sufficiently wet or rather moist, to stick to the plates of the machine when tamped.

The writer's observation of the manufacture of cement brick, is that by the use of a dry facing of fine white sand mixed in the proportion of 1 cement to 2 sand averaging a quarter of an inch thick, backed by a mixture of 1 cement to 4 coarse sharp sand made wet enough to stick together when a sample is placed between the thumb and finger, that very satisfactory results were obtained and with no trouble in curing. On the other hand, such a mixture would force the workmen to wipe the division plates of the machine every second or third batch and they were too much inclined to save themselves this trouble, by using a dryer mixture which could be cured, if at all, only with difficulty and repeated wetting. The difference in the amount of moisture in the two cases is slight, but the difference in the product at the end of twelve hours is very marked. At the end of that period, the brick made with a moist backing would set so that the corner would have an edge sharp enough to cut the skin of the finger if rubbed along it and if the brick were thrown against a hard block it would break in fragments like a burned brick. On the other hand, in one made with the dry backing, the corner could be readily sanded out and if the brick were treated as the other, there would be nothing but sand left of it.

It may be imagined by some that there would be a plane of cleavage between the rich facing and the leaner backing, but in no case has the writer been able to break the facing away from the backing, cleavage occurring in all cases either one side or the other of this plane.

The cement brick the writer has had experience with, unless of considerable age, do not stand shipment well. Better methods of curing will undoubtedly remedy this and seem equally applicable to the block business. A warm, damp atmosphere is most conducive to the hardening of concrete and it would seem that a curing chamber in which the blocks and bricks could be placed and subjected to an atmosphere of exhaust steam, would be an ideal arrangement. To properly realize the possibilities in this line of work, evidently requires honest and thorough work combined with a careful study of methods and results and when this is fully realized by those engaged in this line, we may expect the architect will be ready to favor the material which you have demonstrated, to be strictly high grade. This demonstration, however, must come from the manufacturer, as he cannot consistently expect the architect to specify something which might be satisfactory if the work was well executed, with the chances against this being realized.

In interior construction the advantage of concrete properly reinforced, over timber or steel, lies in its permanence, the perfect protection of the steel against corrosion or destruction by fire and last, but by no means least, to the peace of mind of the builder. The avoidance of complicated shop details and the opportunity for the annoying little errors and endless delays incident to structural iron work.

In treating the subject from the popular standpoint, the writer would say a few words as to the reliability of the construction as compared with steel or timber. Ignorant abuse will render dangerous the best material the engineer uses,—for example, some months ago the writer was called upon to inspect some coupler pockets forged out of 1¼-inch by 4-inch bars. They

were worthless, the writer was told, and going to the pile and selecting four, they were placed on the ground and struck a few sharp blows with the sledge. A single blow fractured 10 square inches of metal in two cases. In normal condition this area would carry 600,000 pounds intension. Taking the shank to a steam hammer, the center was bent flat on itself without fracture, proving that the smith had burned the steel in forging until it was worthless at the bend.

Similar inexcusable ignorance in working concrete, will likewise result in inferior work, but by no means to such an extent as that instance in the case of the steel.

While the use of reinforced concrete is older than steel construction, it is only the low price of Portland Cement that has brought it rapidly to the front. During the time that cement was expensive, it was naturally used sparingly and it is a fact that this custom has had an unfortunate influence in the introduction of reinforced concrete. The use of too weak a mixture and the consequent failure to secure the requisite adhesion of the steel to develop the limited strength of this concrete has brought out a number of deformed bars, the advocate of each claiming special merits.

As the writer has secured, as far as he is aware, greater strength in actual construction with special arrangements of plain bars, than anything claimed by the advocates of special bars, he is inclined to regard the advantages claimed for them as a somewhat definite quantity. In designing the reinforcement of beams and slabs, advantage should be taken of the principles of continuity, since with constant section we have to provide only for two-thirds of the moment of a simple beam and we have but one-fifth of the deflection. Further, by properly lapping the rods we may double the section over the support and require theoretically but half the metal necessary for a simple beam the same strength. This system of design calls for the major section of metal for the flange reinforcement over the support and furnishes ample provision for shear.

In constructing work in this line, it is well to bear in mind that centering is a considerable item and that each additional beam is an extra expense. This fact led the writer to use larger and larger slabs and finally to advocate construction of floors with column spacing 16 to 18 feet centers with no beams whatever, but simply a plain slab and columns. In this connection a few remarks regarding the theory of reinforced concrete, may not be amiss. The theory based upon the elastic proportions of the dual materials, has been derived from experiments on beams and slabs reinforced in one direction and agrees fairly well with the results of tests of work involving the conditions considered in this theory. The conditions resulting from reinforcement in a number of directions are, however, not properly considered in any work that the writer is familiar with. Mr. Chas. F. Marsh makes this statement in his work on reinforced concrete Part S, "Unfortunately it cannot be said that we have a thorough knowledge of the properties of reinforced concrete. It may be that we are wrong from the commencement in attempting to treat it after the manner of structural iron work and that although the proper allowances for the elastic properties of the dual material is an advancement on the empirical formulae at first employed and used by many constructors at the present time, yet we may be entirely wrong in our method of treatment. The molecular theory, that is, the prevention of molecular deformation by supplying resistances of the reverse kind to the stresses on small particles, may prove to be the true method of treatment for a composite material like concrete metal. This theory is the basis of the Cottancin construction which certainly produces good results and very light structures, and in Considere's latest researches on hooped concrete are

somewhat on these lines." As the writer has been able to place a test load on slabs equal to two or two and a half times their figured ultimate strength by the formulae presented in Mr. Marsh's treatise, without injuring the construction nor apparently developing more than a third its ultimate strength, he is inclined to agree with Mr. Marsh and is in the habit of designing those slabs and guaranteeing them not on the basis of text book theories, but by the known relation of the new slab to the slabs tested as regards the depths and the moment of the super-imposed load.

As regards the materials for our aggregate, as a matter of economy we use either crushed stone and sand or sand and screened gravel or where the natural gravel is suitable, the gravel without screening. In crushed stone, the harder the stone, the stronger our concrete. For reinforced work we use a mixture of about equal parts of sand and crushed stone ranging in size from a pea to 5/8 or 3/4 inch diameter and about 1¼ barrels to 1½ barrels of cement to the cubic yard of concrete. For columns we find it cheaper to secure the compressive strength by the use of a rich mixture from two barrels up to two and a half barrels per cubic yard. We can depend on such concrete showing a crushing strength in cubes upwards of 6,000 pounds per square inch and can readily keep the size of our columns to reasonable dimensions with ample strength. The system of reinforcement that we use, consists of a fair percentage of vertical reinforcements used for columns with riveted hoops at intervals of the length. Where we do not employ beams, we bend the vertical reinforcement outward, making an enlarged cantilever top to the column, which is buried in the slab and supports the slab reinforcement and we reinforce the slab in four directions. Where we employ beams, we prefer to break the floor up into panels rectangular and if convenient, approximately square and reinforce our slabs in two or more directions. If we are using gravel for the aggregate, we sample this carefully and vary the amount of cement, dependent upon the character of the material. If the gravel contains some clay and considerable finer material, we use a larger percentage of cement, endeavoring to get practically the same results regardless of the composition of the aggregate. Many have the idea that crushed stone has some peculiar advantage over shingle or the round stones that we find in our gravel. The results of a series of quite comprehensive tests made at Duluth by the Great Northern Power Co., were kindly furnished the writer by Mr. D. A. Reed, their Assistant Chief Engineer. The mixture as I recollect, was practically a 1—3—5. The aggregate was crushed shale rock first, second, crushed Duluth granite and third, Lake gravel. My recollection of the percentages of these tests is that the crushed granite, which is practically a hard trap rock, only showed a little over 90 per cent of the crushing strength of the gravel concrete, and that all the results seemed very satisfactory, running from 3200 to over 4000 pounds per square inch.

In mixing the material, enough water should be used for reinforced work so that the mixture should have the consistency of brick mortar and flow slowly to fill the molds. No tamping should be required, but even with this mixture a certain amount of puddling and jarring, or shaking the reinforced rods, is desirable if the best results are to be secured. Where practicable, as much of the work should be run in at the same time as possible, since a beam or slab which is spliced will show much less stiffness than one which is cast at one time, a condition which can be readily accounted for by the shrinkage strains in the concrete.

A question which is quite frequently raised and concerning which many architects seem to be worried, is whether reinforced concrete can be successfully executed in winter. In engaging in this line of business, the writer will say frankly that this question gave him some little concern. His previous experience in building bridge piers when the temperature was at times 25 or 30 degrees below zero, caused him to consider it practicable to execute reinforced concrete work in the winter and we are now carrying it on every day just as we would in summer, except for the slight inconvenience that we have to keep the snow and ice out of our forms until we can fill them with concrete and are obliged to heat the material that we use. When this is properly done, freezing does not appear to damage the work as much as too rapid drying in the hot summer months.

We have here a number of views of work that we have executed, some showing test loads that have been applied. We have put up nearly all kinds of structures,—office buildings, machine shops, warehouses and paper mills and the writer has recently designed reinforced concrete floors for a large power station in which there are to be three of the largest vertical generators that have been built, having a capacity of 7500 Kw. with 25 per cent overload. These are to run at the rate of about 380 revolutions a minute, and are to be supported on a reinforced concrete slab of about 21 feet in span.

❖ ❖ ❖

Cement Block Architecture

By LOUIS H. GIBSON, Architect, Indianapolis, Indiana

I COULD never have hesitated long in accepting the cement-block idea. I have hesitated long, however, in agreeing to accept cement blocks as at present manufactured. I have recognized the inherent merits of concrete construction, and from the beginning have felt that making concrete in block form was a worthy building and commercial enterprise, but as one interested in architectural work the actual results of concrete manufacture have been such that, until recently, I have felt that I could not afford to encourage and foster this industry. I am doing it now in this way, not because of any decided encouragement through specific results, but on account of what I recognize as a possibility. I know that a worthy cement block can be made commercially. My conviction rests upon the well-known and well-recognized merits of concrete as a building material and because it is desirable to fabricate it into block form. It is difficult to form concrete along proper architectural lines into structural and decorative shapes, such as monolithic walls, columns and lintels. The construction of forms of wood or other material for monolithic structures above gravel is very expensive, not readily practical and by no means satisfactory for structural and decorative purposes. The block machine is the logical form of concrete for building purposes. Through its agency any shape or form may be made. Concrete will come into structural and decorative use largely through the agency of the machine.

Our highest and best thoughts may be given permanent and adequate expression through the medium of the machine and the concrete. But I have never seen an artistically successful structure executed with cement blocks. I am pinning my faith in concrete blocks to what I know can be done, and as not resting upon what I have seen done in a commercial way in a completed structure. I have not seen one worthy artistic expression through this medium. Think of it as you may, regard these expressions as sentimental if you will, say that it is all fol-de-rol, if you feel that way, but bear in mind that the cement block industry will rise or fall, you will make money or you will lose

it, according as you meet the canons of artistic sentiment. Through the medium of cement blocks you must be able to do what has been done with other building material—give expression to the manifold capacities of the human intellect, with all of its hopes, ambitions and emotional flights—give them permanent form in structural material. Few of you will go into business for art's sake, yet for the dollar's sake you must produce the medium of artistic expression. This you have not done.

There are times when it pays to blurt out the whole truth. This is such a time, and this is the truth. Architects are unfriendly to the concrete block as now made. Is this because the architect is unfriendly to concrete? I answer this question by asking another. Who has been more ready to use concrete as a structural medium than the architect? The architect wants to use the cement block. He is always looking for a new medium. The architect will tell you that when you realize the possibilities of this material he is ready to use it.

The most successful terra-cotta concern in the world makes the most artistic forms. They carry out the designs of the architect most faithfully. The most prosperous pressed brick makers in America make the most artistic brick. They have certain stock patterns, well designed, which a self-respecting architect is not ashamed to use. They will make what he wants, but if he hasn't time to wait for the new designs there are often those in stock which he does not hesitate to employ. The architect uses stone, terra cotta, brick, and he uses them in block form. He is not using concrete in this form. This is the fault of the block maker, and not of the architect. As now made, he is afraid of it structurally and decoratively, and doubtful of the general capacity of the manufacturer to carry out his plans.

There are those among us who will say that the block maker is not ambitious to furnish material for the great cathedral, the tall office building, the impressive public structure or the modern palace; that he is willing to let this work go to the quarrymen, the stone cutter or the clay-worker. If the concrete block is not for these important buildings it is not for the cottage, the store or the factory. There is no relative difference in the structural or ideal of these problems. The $1,500 house is deserving of the same quality of attention, the same care, as the important structure.

The block situation is rather unique. Oftentimes in placing a relatively new product before the people one has to bring the people up to his ideals. The public is demanding a structurally better product, a more highly developed substance artistically than you are giving them. The opportunity is a rare one. It is for you to educate yourselves to meet the public standard. A greater opportunity never presented itself to a lot of business men.

Do not imagine for a minute that art needs help from you. It is you who need the help of art, and the foundation of your art is utility. You are not to be patrons of the arts for art's sake. You are patrons of art for your own sake, for your pocketbook's sake. You need art, art does not need you.

It is our aesthetic demands which give great value to raw material. The modern alchemists are the artists, the scientists, the engineer—men who have ideals and give them practical expression. The modern alchemist mixes the sand, the cement, gives it form and turns it into gold. This is the key to the cement-block situation to-day.

The modern alchemist who would turn sand and cement into gold must first learn how to make concrete. Block makers and cement workers generally are lamentably ignorant in this fundamental operation. The impression has gotten out that a laborer who is not fit for anything else can mix concrete; that the cheapest labor that one can employ is good enough to do this work.

This part of the world is well saturated with this idea. The question of brains and the concrete mixer is rarely considered. Almost the only difficulty in the physical composition of cement blocks is in the making of concrete. With this understood and appreciated and thoroughly ingrained into the cement worker, his physical difficulties are well out of the way. The block maker, strange as it may appear, is the most difficult of all men to interest in the mixing of concrete. The architect who talks to the block maker is apt to meet a dull ear on this question. His auditor thinks that it is the other fellow. He will acknowledge that the rest of the regiment is out of step on concrete mixing, but that he is the one man who is in step.

Before we get through with our block business we are going to grade our sand, we are going to know that the voids are reduced to a minimum before the cement is introduced, and we will thoroughly mix the sand and the cement in the dry before the water is applied. Most cement workers believe that they are already doing this. Their wrong belief is the source of the physical trouble. It is the cock-sureness of nearly all that is the real stumbling block. Block makers particularly have been educated by the machine salesman that any old thing can mix concrete. When we learn to mix concrete we can hope to make the impervious block. Cement makers, as a class, have done their work well and scientifically. They have availed themselves of all of the resources of science, and it appears absurd that this work should have stopped with the making of the cement. The chemist, the engineer and the cement maker have joined hands in the mixing of concrete. In the making of blocks they have parted company. We have been floundering around, doping our blocks or letting the rain pour through them merely because we have not given the right kind of attention to a primary step in block making.

We may take lessons from the modern mechanical mortar maker in the mixing of the aggregate in concrete. He dries his sand and mixes it mechanically. The makers of bitulithic pavement have reduced the grading process to a science, and on that account are reaching a large measure of success. We may study a modern asphalt plant with profit.

Sand must be clean. Most cement blocks that I know anything about are made of dirty sand. All of them were of a muddy tone. If one would make a clear, crisp, life-colored block he must use clean, crisp, sharp, live sand. Barnyard mixtures make barnyard colors. Most of the blocks that we see are dull, heavy, lifeless and leaden in color and texture. This can be obviated by clean sand and a proper proportion of cement of the right kind. The oolitic stone that we use in our best buildings is almost absolutely pure in its ingredients. As we ride through the country and see the cement block buildings, with their dull, leaden color, we may trace it to dirty sand. We may do whatever we please with cement mixtures with respect to color and texture. We may make a white block, if we will, but we must use white sand and white cement and must handle it with clean hands and clean tools.

We will mix our aggregate with more water than has been common with most of us. We will experience troubles from crazing, hair-cracking, if we do not take advantage of our opportunities. The cause of this trouble from cracking suggests its own remedy. It is the relatively neat cement on the outside of the block, the difference between the composition of the surface of the block and the interior—a difference in contraction. If our blocks are of the right composition we may wash them and we may cover them with damp cloths while they are setting. We may rake them over with a fine-toothed tool. We may give them a texture with a white wire brush. The man of resource, keen perception and artistic insight will find many ways of getting around this difficulty.

The principle involving the production of proper texture is not difficult

to understand when we analyze it. We want cement enough, certainly not too much. We know that we want it evenly distributed. The nearer we can come to exposing the sand on the surface, the nearer we can come to having the view side of the sand, the side that we see, free from cement, the better. Those of us who can remember the lost art of old-fashioned, hard-finished wall plaster know what this means. With a brush and water the plasterer washed out all superfluous lime, and up to a certain point the more lime he washed out the harder and stronger, brighter and crisper he got his plastering. This principle may be applied to the surfacing of cement blocks. In one way or another we shall wash out the neat cement. Unless the proportion of sand and cement be uniform, the texture will not be uniform. The best brick that are now made for decorative purposes, for facing, are not intensely smooth. They have a grain—a texture, we call it. The surface is gritty. It has somewhat of a sandpaper quality. It receives the light in a pleasing way. This is what we mean when we say that a surface of stone or brick has good texture.

I have merely hinted at the possibilities of color work in concrete. We have not yet reached the stage where it would be very profitable to go into this. When we know how to mix sand and use clean materials and mix the cement and water with it, when we know how to handle our blocks, when we know texture and uniformity, then may we consider color. It is sufficient to say that the liveliest imagination of the Arabian and the people of the Orient may find permanent record and adequate expression in the color, texture and substance of the cement block. We will have to get out of the backyard and shed stage of this industry, however, before we can take up cement polychrome.

The immediate task before us is to do the best with what we have, with the men and the brains that we have, with the sand and the cement that we have. The cement is adequate to our capacities for some time to come. We can afford to disturb ourselves a whole lot less about cement and a whole lot more about sand.

An influential cause for the feeling which architects have for the cement block is the difficulty of having their plan exactly carried out. There is too much cut-and-try business. The architect or the builder is not going to submit to compromises in one material that he does not have to submit to in others. In terra cotta, stone and brick all plans can be carried out to a nicety, and there are no advantages otherwise in the concrete block which will lead to a compromise in its favor. The setting plans of a stone cutter and a terra-cotta worker are marvels of neatness, exactness and accuracy. Great buildings are built practically without the sound of the hammer. Certainly the work is fitted before it leaves the cutting shop or the factory. There is no reason why this should not be done in the same way by the block maker. It must be done or the block business will not succeed. I recently had an experience with a block maker who made a setting plan on a shingle and then lost the shingle.

Mechanically the cement-block industry is in good shape. The work has been fostered and promoted very largely by machine makers. However, the industry has been injured by the machine salesman, who has minimized and at times concealed the difficulties in the way of making a commercial block. So far as the block itself is concerned, the machine is the least important factor in its manufacture. A cement block can be made in a wooden box. Any machine will make a block that is commercially satisfactory if the material is at hand to put into it, providing there is an opportunity for proper tamping or compression. The important part which the machine plays in this industry is in reducing the cost of the block. This work has been well done and little

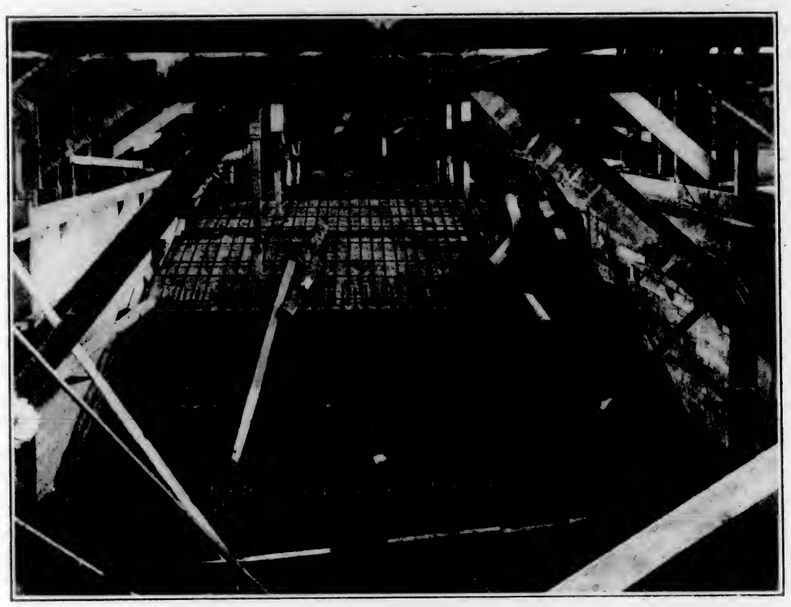
need be said about it here. It is well for the block maker to understand, however, that he must be able to so adjust his machine that a block of any size in any direction within fractions of an inch can be readily made on a commercial basis. The builder, the house owner, the investor can get what he wants in other materials, and he will not put up with compromises in the block.

The laying out of the work in the shop and the preparation of careful shop drawings will very largely eliminate the evil of indifferent handicraft, bad workmanship, and we all know that there is no branch of the building business that has suffered as much at the hands of the botch as the block industry.

Concrete, in its nature, suggests a comparison with stone. Hence the high standard. A part of beauty in a building is color, texture, general design, but after that there comes the question of detail, of the parts, the moldings, the ornament. On the one hand, there is mere construction, mere building, and then there is art. In order to have architecture there must be both building and art. In architecture the two are inseparable. It costs no more money to make a beautiful form than it does an ugly one. I would regard it as an opportunity lost if I did not say here and now in the strongest terms at my command that there is no excuse for an ugly structure of any kind in this world. Be it a building, a bridge, a bit of furniture, a machine or any other object in which material and labor are brought together, there is absolutely no excuse for ugliness on any account. There is no excuse for ugliness on the grounds of cost. Good proportion costs no more than bad proportion, harmony of color costs no more than inharmony; there is no more expense of material or labor in a well-formed molding than in an ugly one. There is no more expense attached to grace than to clumsiness. Beauty is a condition of mind, a condition of heart, of character, and not one of pocketbook. Clumsiness and crudeness come out of a crude and clumsy mind. It takes no more time or material and no more labor to cast a beautifully-formed block than one ugly in form. I do not say that one form may not be more expensive to cast than another, but I do say that there is no excuse for casting an ugly one. Everything made by man might be beautiful without material consideration. There are certain standard forms that can be produced and reproduced as they have been for more than twenty-five hundred years. The repetition has had no effect upon their beauty or appreciation by the public. The forms most commonly in use at this time by architects and artist builders date from the fifteenth and sixteenth centuries. It is from this source that the ornamental brick makers draw most of their inspiration. It will be necessary for you to employ artistic designers who can design for you certain relatively simple standard designs which may be readily adaptable for various purposes. This is eminently a practical thing to do, and it must and will be done if the block business reaches any large measure of commercial success. Hitherto he has been a great sinner in producing the crude and ugly shapes.

The cement-block machine is a great art democrat. It may produce and reproduce artistic forms for the masses. It may give us beautifully decorated structures at a minimum of cost. Art is not for the few any more than education is for the few. Art should be for everybody. Art should be democratic, and the block machine should be a great art democrat. There is an intimate relation between this idea and the bank account of the block maker.

There are those among you who will say that these expressions in regard to the making of concrete, the grading of sand, the cleaning or washing of sand, the fine adjustment of mixtures, the matters related to color, form and art are ideal. Possibly they are ideal. We progress through idealization. The cottage is a man's materialization of a state of mind which seeks something more than to keep out of the wet and cold. But for the idealization, we would not quarry or cut stone. We would not make brick.



Reinforced Concrete Bridge, Pollasky—View Showing Reinforcement C-331

Reinforcement in Pollasky Bridge

THE cut shown on this page is a view of the forms and corrugated steel bars as used in the Pollasky Bridge, a description of which structure, accompanied by typical illustrations, appeared in the last number of this Journal. The bridge as it stands contains about 3,000 yards of concrete in which 90 tons of Johnson's corrugated steel bars were embedded to take up the tensile stresses produced by bending in the rib and to provide the necessary resistance for those portions of the spandrel wall acting as beams.

The corrugated bar here used is particularly well adapted to this class of work in that it is easily handled, it is efficient, and, owing to its high elastic limit, it is economic. The patentees for this bar guarantee an elastic limit of from 50,000 to 60,000 pounds per square inch, and an ultimate tensile resistance of 100,000 pounds per square inch.

The life of the steel in this bridge is indefinitely prolonged by its protection from the air.

The type of bar herein mentioned was used throughout for two other large bridges now in course of construction in California and for one just completed in Nevada, all of which structures were designed by Mr. John B. Leonard, of San Francisco.

❖ ❖ ❖

The coat doesn't make the man, but the lawsuit makes the attorney.

❖ ❖ ❖

Query: Is the poor man who marries a rich grass widow in clover?

The National Cement Users Convention

By WM. B. GESTER, C. E.

IF ANY feeling has existed, that the wonderful new interest in the use of concrete and manufactured stone, which has grown up in this country during the course of the last three or four years, has in any wise ceased its growth; if any idea has been engendered, that the enthusiasm and confidence of the great numbers of wide-awake men who have recently gone into the business, has in any degree waned; if any belief has been held by ultra-conservative souls, that the movement is temporary, or in the nature of "fad"; such feeling, idea, and belief have received a solar plexus blow in the success of the convention of the National Association of Cement Users, which was held in Milwaukee during the week beginning January 9th, for the meeting was largely attended, the interest and enthusiasm were unabated, much valuable knowledge was disseminated, and finally the incorporation of a National Association of Cement Users was decided upon and the first board of officers elected.

The first paper on trade subjects, was that read immediately after the temporary organization, by Mr. Sanford E. Thomson, consulting engineer, of Newton, Massachusetts, on "Concrete Aggregates." This was followed by an address by Mr. George L. Stanley of Ashtabula, Ohio, on the subject of "Concrete Streets, Sidewalks, and Floors." Incidentally the matter of the use of salt in concrete, made and laid in cold weather, was dwelt upon, and the results of a number of recent valuable experiments given to the convention.

The address of President Richard L. Humphrey of Philadelphia, which was illustrated with excellent stereopticon views, was in the nature of a report of progress and a general resume of the subjects to be touched upon during the convention. Mr. Humphrey's views were of a technical nature and were highly interesting and instructive to the members of the profession.

Stereopticon talks were also given by A. L. Johnson, civil engineer of St. Louis, on the subject of "Steel for Reinforcement," and by Ross F. Tucker, president of the Concrete Association of New York, on "Twenty Years of Experience in Concrete Construction."

At the morning session on Wednesday, January 10th, C. A. P. Turner, civil engineer of Minneapolis, read a paper on "Cement in Building Construction," illustrating it with stereopticon views; following which, President Richard L. Humphrey, consulting engineer, Philadelphia, read an interesting paper telling of investigations of cement mortars and concretes made at St. Louis, also with stereopticon illustrations; R. W. Lesley, a Philadelphia cement manufacturer, clearly defined the relations which should exist between the manufacturer and the user; Charles E. Watson, of Toronto, chairman of the committee on art and architecture, concluded the morning session with a committee report, in which he showed that the use of cement for building purposes had already resulted in a better style of architecture.

At the evening session Louis H. Gibson, of Indianapolis, read an interesting paper on cement block architecture, and was followed by S. M. Woodward, of the United States Department of Agriculture, who showed the many ways in which cement and concrete might profitably be employed upon the farm, taking in many things the place of wood. One of the most generally interesting papers of the session, because it was not necessary to treat it from

Showing Test of Reinforced Concrete in Los Angeles Building C-332

Reinforced Concrete Test

THE following state of a test on reinforced concrete floor in the Hayward Hotel Building, Los Angeles, was prepared by Architect C. F. Whittlesey:

Size of space loaded, 225 square feet.
Thickness of floor, 4 inches.
Size of girders, 10x16 inches.
Size of intermediate beams, 5x15 inches.
Distance between centers of beams, 5 feet 4 inches.
Total load on space, 104,625 pounds, 465 pounds per square foot.
Deflection in center of space of completion of loading, ¼ inches.
Deflection 36 hours after loading, ¼ inches.

Calculated load required to destroy panel, approximately 985 pounds per square foot, and in this loading the floor would not break suddenly, but would deflect probably ⅝ inch, at which point it would begin to show cracks and would fail gradually and give ample warning before breaking.

❖ ❖

No woman cares to be a silent partner in a matrimonial firm.

❖ ❖ ❖

Don't attempt to belittle others because you feel that they are superior to yourself.

a technical point of view and also because of the action taken by the association in an afternoon, was one on the value of organization, read by I. S. McDonald, of Milwaukee.

"This is a much larger convention," said President R. L. Humphrey, "than we had at Indianapolis. There are more exhibits both of machinery and finished products, more and better papers, and a much larger attendance, over 800 having already registered. It was this evidence of growth which made us consider the matter of incorporating. Our society had grown beyond that size where it could safely be conducted without any further foundation than that given by its constitution and bylaws. I certainly am much pleased that Milwaukee was chosen for this convention."

Among the interesting papers presented to the convention on Thursday, the third day's session, were the committee reports on "Machinery for Cement Users," one on "Concrete Mixers," by E. B. Kelly, of New York, and one on "Pneumatic Tamping and Mechanical Conveying of Concrete Blocks," by J. P. Sherer, of Milwaukee. The latter was a very interesting address, describing the most modern, and undoubtedly the most economical methods of manufacture of the now almost universally used "Hollow Block."

Then followed papers on "Water-proofing," by J. L. Motherhead, of Indianapolis; "The Manufacture and Use of Concrete Piles," by Henry Longcope; "Causes of Failure," by O. U. Miracle; a paper describing the causes leading to the failure of some who have engaged in the concrete block business, which will be presented in its entirety in "Architect and Engineer"; also an address on "The Choice of Cement for Concrete Blocks," by Richard K. Meade, Chemical Engineer, of Nazareth, Penn.

Mr. S. B. Newberry, of Sandusky, Ohio, in his paper upon "The Manufacture of Hollow Concrete Blocks," suggested some improved processes and tests. He denounced the practice of making blocks in imitation of cut stone. Concrete blocks were stone, he said, and if they were to be cut the cutting should be done by hand. The lack of individuality, the monotony of appearance, the fact that block-makers tried to force upon them a certain standard size, were causes which explained the hostility of architects to concrete blocks.

The session on Thursday concluded with a paper by E. S. Larned, of Boston, on the "Testing and Use of Cement."

On Friday the programme included an exhaustive report on "Cement and Concrete Tests," one on "Laws and Ordinances," and one on "Fireproofing and Insurance." These committee reports served as texts for discussion which was general and very interesting.

Following the reading of the paper of I. S. McDonald, of Milwalkee, on Wednesday, on "The Value of Organization," the matter having been most thoroughly discussed, it was decided to incorporate in the District of Columbia under the national law the "National Association of Cement Users."

Charter and by-lays for the incorporation were ratified by the convention, and the following officers elected:

President—Richard L. Humphrey, Philadelphia.
First Vice-President—Merrill Watson, New York City.
Second Vice-President—J. H. Fellows, Scranton, Pa.
Third Vice-President—O. U. Miracle, Minneapolis.
Fourth Vice-President—A. Monsted, Milwaukee.

A resolution was unanimously adopted, addressed to the speaker of the House of Representatives, imploring Congress to appropriate a large sum of money for the continuance of the important work being done by the United States Geological Survey in the investigation of cement mortars and concretes and other structural material. The memorial states that the association rec-

ognizes the importance of this work and emphasized the need of reliable information which will help them in the design of concrete reinforced structures and the use of cement generally.

The association was divided into several districts, each presided over by a chairman, who shall be a vice-president of the association.

One of the most interesting features of the convention was the display of all sorts of machinery for the users of cement and concrete.

Fourth street, in front of the Convention Hall, resembled a section of a State Fair, as a number of concrete mixers with motors or operating engines were stationed there. During the sessions these were in operation and were an attraction for hundreds besides the attending delegates.

Every available foot of floor space within the hall, and more than 12,000 square feet of the main floor of the Frei Gemeinde Hall, one block south on Fourth street, were utilized by the many exhibitors. Brick-making machines, mixers, carriers and every other known machine and tool used in the trade were shown and explained, while many attractive souvenirs were given away to visitors.

The meeting was an unqualified success. It has resulted in a national organization, an incorporation, which will care for the general interests of the trades connected with cement and concrete. It will insure future investigations, scientific and practical tests and the distribution of knowledge of best methods and of all improvements, and cannot but help to further and strengthen the already phenomenal growth of the industry it represents throughout the whole country.

* * *

Has Withstood the Test of Time

Nearly ten years ago; or to be exact, in the Spring of 1896, there was erected at Willow Grove Park, one of Philadelphia's popular resorts, a handsome fountain. The fountain was placed in a large artificial lake, upon which pleasure boats ply. The fountain is an electric device, said to be the finest in America. Below the fountain proper is a room containing electric lights and other apparatus, which is back of the window directly in the center of the fountain. The ceiling of this room is made of boiler plate, and after it was in place it was found that, on account of the haste to get the work done in order to open on a certain day, no provision had been made to form a basin to keep the water from running directly off the plates when it fell from the sprays.

It was desired to construct a basin about a foot deep, over the edge of which the water could flow in a sheet. The engineer decided to use expanded metal, and light iron brackets were bolted to the plates already in position. These brackets were then covered with expanded metal, forming a series of eight semi-circular balconies, which were plastered in Portland cement, a layer of the same material being spread over the iron plates.

The upper portion of the eight piers around the outer wall, and which rise from the water level, was constructed in the same way, at a great saving over the cost of cut stone, and in a very much less time. The whole job was completed in a few days. As stated, the work was done years ago, and up to date has been entirely satisfactory. The fountain is exposed to heat and frost but the cement work remains intact.

Heating, Lighting and Electrical Work

Modern Ventilation

By F. H. BRYANT

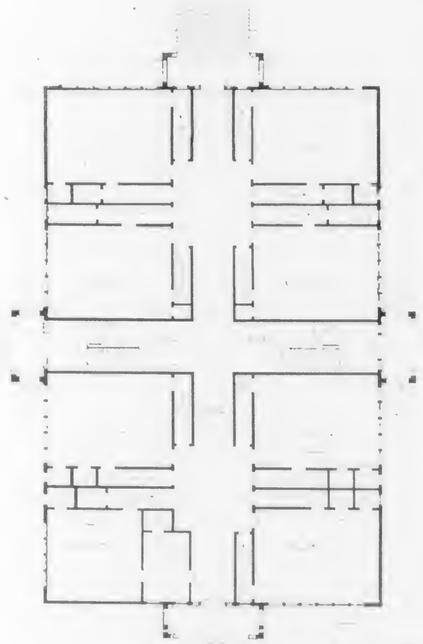
UNTIL quite recently ventilation has been generally regarded as a luxury rather than as an absolute necessity. The discomfort of a poorly-ventilated room has been realized with sufficient vividness, but the difficulty of substituting for the debilitating atmosphere one that is pure and invigorating has in many cases been so far beyond the power of ordinary methods to accomplish that a crowded apartment and a vitiated atmosphere have been looked upon as inseparable. But such an atmosphere is more than uncomfortable and disagreeable; it is positively and undeniably injurious, and continued exposure to it is certain to lead to serious consequences.

The evil effects of lack of ventilation are made only too evident by such facts as that "death-rates have been reduced by the introduction of efficient ventilating systems, in children's hospitals, from 50 to 5 per cent; in surgical wards of general hospitals, from 44 to 13 per cent; in arm hospitals, from 23 to 6 per cent."

While such figures show directly traceable results of breathing impure air, it is not in these most serious consequences alone that its evil effects are revealed. A vitiated atmosphere lowers the vitality, increases the susceptibility to and severity of disease, and decreases the physical and mental working power of the individual, and, while not producing sudden death, nevertheless inevitably shortens life.

Air. Air being the prime supporter of life, health, and even life itself, are dependent upon the composition of atmosphere. Although simply a mechanical mixture, yet certain gases of which it is composed exist in almost unalterable proportions in the normal atmosphere. Oxygen and nitrogen, the principal constituents, are present in very nearly the proportion of one part oxygen to four parts of nitrogen. Carbonic acid gas, the result of all combustion, either slow or rapid, exists in the very small proportion of three to four parts in ten thousand of air, while the aqueous vapor varies greatly with the temperature and exposure to water. In addition there is generally present in air in variable but exceedingly small quantities ammonia, sulphureted hydrogen, sulphurous acid gas, floating organic and inorganic matter and local impurities.

Long Beach School House *J. Lee Burton Architect* C-333



Floor Plan Long Beach School House C-334

Humidity. The condition of the atmosphere with relation to the amount of vapor or water which it holds in suspension is expressed by the term humidity. Actual Humidity relates to the actual weight of water vapor present in a given unit volume of air, while the term Relative Humidity expresses the relation between the vapor actually present in the air and that which it would contain if saturated. Obviously the air is saturated with moisture when it will hold no more. The actual humidity varies excessively with the temperature; it is, therefore, evident that a statement of the relative humidity gives no indication of the exact amount of vapor present unless the moisture carrying capacity of the air at the given temperature be known.

Carbonic Acid Gas. This gas is of itself only a neutral constituent of the atmosphere, like nitrogen, and, contrary to general impressions, its unassociated presence in moderately large quantities—as in soda-water manufactories—is neither disagreeable nor particularly harmful. But its presence in the air provided for respiration decreases the readiness with which the carbon of the blood unites with the oxygen of the air to form, in the lungs, further amounts of carbonic acid. It is evident, therefore, that when present in sufficient quantity, it may directly bring about not only serious but fatal results. The true evil of a vitiated atmosphere lies in its other constituent gases and in the micro-organisms which are produced in the process of respiration. It is known, however, that these other impurities exist in fixed proportion to the amount of carbonic acid present in an atmosphere vitiated by respiration.

Therefore, as the relative proportion of carbonic acid may be easily determined by experiment, the fixing of a standard limit of the amount in which it may be allowed in ventilated rooms also limits the permissible vitiation of the atmosphere by other impurities.

When carbonic acid is present in excess of 10 parts to 10,000 parts of air, a feeling of weariness and stuffiness, generally accompanied by a headache, will be experienced, while even with 8 parts in 10,000 parts, a room would be considered close. For general considerations of ventilation the limit should be placed at 6 to 7 parts in 10,000, thus allowing an increase of 2 to 3 parts per 10,000 over that present in outdoor air, which may be considered to contain 4 parts in 10,000 under the ordinary conditions of a populous district.

❖ ❖ ❖

A Long Beach School House

THE school building shown in this number was built at Long Beach from plans by Architect J. Lee Burton, of Los Angeles. It is considered one of the most up-to-date school buildings in Southern California, containing fourteen class rooms on the first and second floors and two Lloyd rooms in the basement, besides a gymnasium, furnace room, boys and girls' toilet rooms, bicycle rooms, etc.

The Lloyd rooms have Oregon pine floors while the other basement room floors have concrete floors. There is a hot air heating plant, with the fan system to heat all rooms and halls.

The halls are supplied with drinking fountains and standpipes for fire purposes. The exterior of the building is Mission design, with the roof covered with cedar shingles with galvanized iron gutter.

The cost of the building was $36,000.

Residence of Mr. F. W. Braun, Los Angeles *Hunt & Eager, Architects* C-335

Living Room in Residence of Mr. F. W. Braun, Los Angeles *Hunt & Eager, Architects* C-335

Terra Cotta and Brick

Bricks Have Made History

By W. E. DENNISON

THE world's events have had no more safe deposit than that afforded by its brick structures. To their ruins in the worn-out countries, whence come our classics, are we indebted for an imperishable record of the ancient peoples of the earth. Bricks have made history. A country without bricks is one whose history is unwritten, a mere myth. The brick-making peoples have been those whose energies were confined to one locality and devoted to the betterment of the race. They have ever been the progressive peoples. None of them were ever slothful in their youth or at maturity, and all have been glorious even in decay.

Man's highest aspirations have ever been to build structures that should emulate the mountains of his Maker not only in grandeur, but also in endurance. What a miserable creature is man in a wooden town! What a here-to-day-and-gone-to-morrow feeling possesses him!

Who does not remember the days of wooden San Francisco and the execrable architecture thereof, whose comfortless remnants still cumber our streets clamoring for the oblivion of a conflagration?

But, happily, we belong to one of the great history-making races and have at last found time to begin the first chapter of our permanent life by making and laying up brick in buildings not to be excelled in any city.

* * *

Fireproof Theatres

By W. I. PARRY, in Fireproof Magazine

THE theatre fire lesson has been taught so often and with such severity and vigor that it is questionable whether it does not take first place in the curriculum of the knowledge bought with bitter experience. Its strenuosity suggests the emphatic method of the old-fashioned schoolmaster who forced his lessons into the heads of his pupils with the helpful aid of the rod or birch, driving home truths that went through the anatomy from end to end and perhaps produced the memorizing effect sought for by reflex action.

Yet, notwithstanding the severe and repeated punishment inflicted for disregarding the most palpable causes of disaster, it seems as if all the teaching has fallen upon barren soil when the constant repetition of errors in construction and the disregarding of attempts at prevention of the fire evil are considered.

After the many sorrowful calamities which the world has experienced, it would seem that in buildings of this character at least the insistence upon fireproof or fire preventive characteristics would be almost the first and last thought of the owners, the architects and particularly of the government authorities. Yet comparatively few consistent efforts have been made to secure this greatly desired result—a result not so difficult to attain if effort, knowledge and experience combined with intelligence and some extra expense are brought into play.

In the first place, buildings of this character should be absolutely required to have streets or wide alleys on at least three sides, so that easy methods of egress could be provided, besides serving to prevent the communication to the theatre of a fire in an adjoining building. With this first great advantage gained, one of the most serious problems to be considered is near a solution, and as it is from the lack of facility for the rapid emptying of the living contents of the building that the greatest menace to life and limb arises.

As to the construction itself, after this first great advantage has been secured the next step toward the desired end is the complete separation by thick brick and mortar walls of the stage from the auditorium, extending the stage portion of the building and its walls above the highest elevation of the roof of the auditorium and the installation in the stage or proscenium opening of a thoroughly tested fire curtain so arranged that its action will be quick when the emergency arises. The roof of the stage should be supplied with skylights or openings that will be open and free should fire occur, acting as chimneys for this, the most dangerous portion of the building, where fires most often originate. The flames and smoke are thus diverted from the auditorium, where human life in abundance might be their easy prey. A possible fire would thus be more easily confined to a small space, and there would be less danger of the audience becoming panic stricken by the smoke permeating the auditorium. Another novel feature which admits of freer entrance and exit is the automatically closing and revolving seat, which gives almost unlimited aisle space, and thus helps to remove dangerous obstacles in cases of fire or panic.

The making of the stage itself fireproof, or, at least, fire-confining, is not so difficult as it is likely to be considered. There are now in this country theatres where the stage itself is built of steel beams and fireproofing, the bridges on either side and the gridiron above of steel, with fireproof roof above all, thus reducing the fire danger to a minimum, and, in some cases, it is still further reduced by chemically-treated scenery. If all this is done, much has been accomplished toward the attainment of our ideal.

So far as the auditorium is concerned, the use of fireproof material can here be made particularly adaptable, notwithstanding the apparent absence of the straight line from its constructive features, and instead, the glorification of Hogarth's dictum, "The curved line is the line of beauty." Several practical examples of fireproof construction applied to auditoriums exist in this country. Among the earliest of these is the little theatre adjoining the Great Southern Hotel in Columbus, Ohio. Here steel beams were used largely, and one of the most notable developments was the almost total elimination of columns for the support of galleries, there being only one at each side of the building, situated so that they adjoined the two side aisles, these being introduced merely to reduce the span of the large box girder which supports the entire gallary. Each gallery is carried by a single deep box girder completely hidden from sight. The beams supporting the gallery floors act as cantilevers, with the girder for a fulcrum, and using the top flange or cover plate

for their support, with light ceiling beams framing into their lower flange, making a flush ceiling curved back of the girder and producing a better architectural effect than a straight ceiling. By the use of this deep girder construction, all obstructions to sight and sound ordinarily offered by the columns are removed, and the whole auditorium has an open effect that is peculiarly attractive. The entire ceiling or dome of the auditorium is carried by a steel framework of angles curved to produce the trumpet dome effect, similar to that of the Chicago Auditorium, with which, doubtless, so many of our readers are familiar. This ceiling frame is pendant from the lower cords of the steel trusses which carry the roof. The "flare-out" from the proscenium arch, forming the opening of the trumpet, is also made of steel angle framing, and the proscenium boxes are built up of steel beams and angles.

The parquette floor rests on beams framed to the slopes required. The support of this floor, as can be readily appreciated, is a comparatively easy proposition, the girders into which the beams frame being supported by columns which, being in the basement or cellar of the building, do not interfere with any arrangement of the seating, seeing or hearing, the main things sought for in theatre construction.

A theatre on similar lines to this, but very much larger in every way, is the Nixon, erected in Pittsburg during the last few years. Here the first great advantage referred to in the early part of this article is secured. The building is surrounded by streets or alleys, except at the rear of the stage, with ample means of exit, interior stairways and exterior fire escapes for both galleries, and, in addition to these methods of egress, there is introduced a most novel arrangement for the easy handling of crowds. This consists of gradual slopes or broad aisles on each side of the building, starting from the front entrance and gradually rising from the first floor until the level of the lower balcony or gallery is reached. These two slopes are of ample width and so gradual and easy that a crowd should be able to escape from the first gallary in case of fire or panic, with the danger of accident reduced to a minimum.

In addition to these two slopes, the gallery is also supplied with two separate flights of stairs which reach the back or highest part. From this point two easy slopes run down the sides to the front of the gallery, thus making four separate avenues of exit exclusive of the exterior fire escapes on each side of the building. The upper gallery is supplied with entirely separate staircases with entrances and exits on the two side streets or alleys, and, in addition to these, there are the exterior fire escapes.

The stage building is separated from the auditorium by heavy brick walls carried above the top level of the auditorium roof, so that the stage is, in a way, a building by itself. Beams or steel framing were used for the floor of the stage as well as for all floors, galleries, staircases and slopes in the auditorium. The roof of the stage building is supplied with skylights which are opened from the stage below, making complete draught in case of fire. The galleries are carried by large cantilever trusses extending over transverse girders acting as fulcrums, which in turn are supported by columns. These columns, however, are reduced to a minimum and so placed that they offer little, if any, obstruction to the view. The seating capacity of these galleries is large and the main lines are so arranged that nearly every seat in the house commands a complete view of the stage. The entire effect is one of openness and roominess, the aisles being wide and the space between seats permitting easy ingress and egress.

In this article only two existing theatre buildings have been mentioned, and these only in a very general way as illustrations of the fact that reasonable construction, consistent with our best knowledge, is attainable and prac-

Dining Room in Residence of Mr. F. W. Braun, Los Angeles *Hunt & Eager, Architects* C-3337a

ticable. There are several others of comparatively recent construction which are quite as good as, if not better than the two described, so that sufficient object lessons have been given of how such buildings can and should be erected. This being so, positive action should be taken in every community or state to compel proper care and intelligence in design, conforming to carefully drawn ordinances, which shall be executed by the authorities and not become simply a written, inactive dead letter.

The final results from a serious theatre fire may be so serious and widespread that they often reach the magnitude of a public calamity, like the terrible Chicago holocaust, which is still green in our memory.

Admitting that such improved construction will materially increase the cost of the building over that of the usual construction, surely the necessity for a higher regard for human life more than warrants this extra cost, and, indeed, is obligatory upon any well-organized community of our modern civilization.

* * *

The Barossa Concrete Dam

The United States reclamation service that is engaged in the work of reclaiming the arid wastes of the Southwest by vast systems of irrigation has taken up a study of the work performed along similar lines in Australia, and there the great Barossa arched concrete dam is typical of much that has been accomplished. Concerning this dam, the chief engineer engaged on the work, Alexander B. Moncrieff, has submitted an illustrated memorandum to the "Transactions" of the Association of Civil Engineers of Cornell University.

The Barossa dam is used to impound water for the town of Gawler and its vicinity, and the supply above what is needed for domestic uses is taken to irrigate the land. The dam is in a gorge 370 feet wide at the crest elevation, and 94 feet above the ground line at the bottom. The structure is arched in plan, the radius of the crest being 200 feet. The total length along the crest is 472½ feet.

The City Beautiful

The San Francisco of the Future

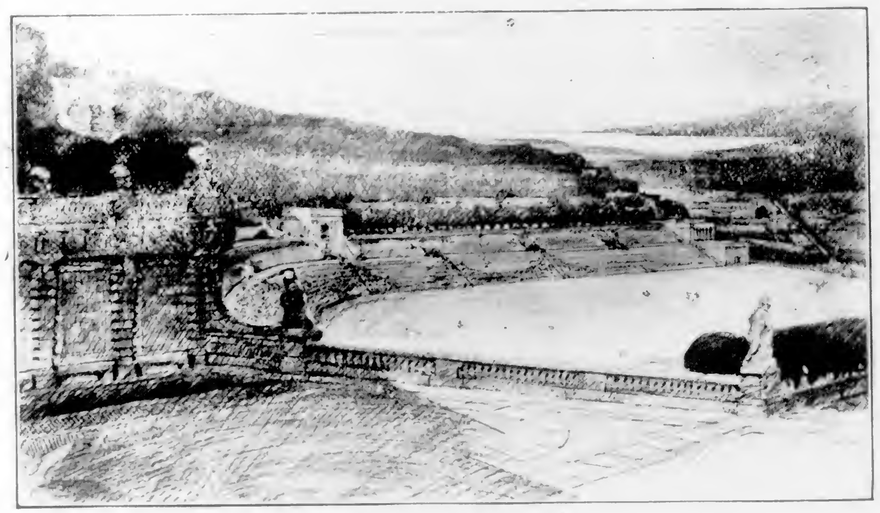
By MR. HERBERT E. LAW

IN the September and October issues of the Architect and Engineer there appeared excellent articles on the Burnham plan for beautifying San Francisco, by John F. McCaleb, secretary of the Association for the Beautification of San Francisco, and Charles Brown, architect. Both papers were accompanied by illustrations furnished exclusively to this magazine by Mr. Burnham. The drawings were, in fact, the first to appear in print, after Mr. Burnham had submitted his report to the Association. In view of the interest shown in the report, the following article, written by Mr. Herbert E. Law and published in the January Craftsman, is interesting in that it takes up various phases of the plan not previously covered to any extent in the Architect and Engineer:

"Not to be outdone by her Eastern sister cities, San Francisco, too, is entering upon a systematic plan of adornment and improvement. She has had her civic awakening; much of it due to a very active Merchants' Association, which during the ten years of its existence has not only brought about many reforms and improvements, but has also stirred up public spirit. A second organization that has done much good is the Association for the Advancement and beautification of San Francisco. This organization was formed in January, 1904, with ex-Mayor James D. Phelan at its head. In the search for a mind capable of realizing these high ideals the Association was fortunate enough to secure the services of Mr. Daniel H. Burnham, builder of cities. Ample funds were provided to permit Mr. Burnham to work unhampered. Mr. Burnham has developed great enthusiasm over his task. He has expressed himself to the effect that San Francisco affords unprecedented opportunities for accomplishing great results in city building; that it has one of the noblest sites of all the cities of the earth.

"The problem, stated in Mr. Burnham's own words, is this: 'It is proposed to make a comprehensive plan of San Francisco, based upon the present streets, parks and other public places and grounds, which shall interfere as little as possible with the rectangular street system of the city.' Such subjects are covered as the direction and length of all the proposed streets, park-ways and boulevards; the size and the location of proposed places, round points and playgrounds; the size, location and broad treatment of proposed parks. Plans for a Civic Center form an important part of the work. There are, moreover, a number of practical suggestions regarding such subjects as the location and relation to one another of the several elements of the city—administrative, industrial and residential; the control of traffic and of the various public conveniences; the control of domestic and business architecture; the beautifying of streets, sidewalks, etc.

Proposed Stadium near Twin Peaks *D. H. Burnham, Designer* C-337
(Reprinted from the October *Architect and Engineer* by request)



Proposed Military Parade Ground at the Presidio *D. H Burnham, Designer* C-338

"Before detailing something of these plans it will be well to point out briefly the topographical peculiarities of San Francisco. Unlike many Eastern cities, whose means of communication with the surrounding country are evenly divided among their radial arteries, San Francisco is situated at the extremity of a peninsula forming the northern outlet of the great Santa Clara Valley. A break in the Coast Range Mountains, a little over a mile in width, has joined the ocean and the bay at Golden Gate Straits. Down the western side of the peninsula run the low hills of the Coast Range, its base lapped by the Pacific Ocean. To the north and east, the city is bounded by San Francisco Bay, which follows the peninsula southerly on the eastern side for nearly fifty miles. Thus the city can, in the future, develop only to the south.

"The other peculiarity is the hilly formation of the city and the manner in which the streets have been cut through. San Francisco has been aptly called the City of a Hundred Hills. Whatever the approach, one cannot travel far without going up hill and down dell and down dell and up hill again. The whole northern portion is such a succession. The approach by water either from the north or east gives a vivid idea of this conformation. Also a too vivid idea of the way in which the difficulty of locomotion was overcome by the forthright Anglo-saxons who laid out the city in their impatient way. They plowed their streets straight up and over and down the hills, regardless of contour regardless of everything except to "get there." At first view from the bay the city looks like a checker-board, marked in every direction by what seem to be ditches, cut at right angles. These are later seen to be streets. One of the most difficult things will be the modification of these rectangular streets, especially in the hilly districts. To this we will return later.

"The core of the New San Francisco is to be the Civic Center, located at and about the geographical centre of the city—the junction of Van Ness avenue, the principal boulevard, running north and south, and Market street, the city's main artery, extending east and west. About the Civic Center, within a radius of a dozen square blocks, will be housed the administrative and intellectual life of the city, including the Post Office, a new $2,500,000 building just completed; the City Hall, the grounds of which will be enlarged and co-ordinated with the scheme, and the Public Library. The site has already been purchased—a square block on Van Ness avenue near Market street. A million dollar building will be started next year. This, with part of the money provided by the recent $18,000,000 bond issue. The proposed buildings for the Civic Center are the Opera House, the Concert Hall, the Municipal Theatre, the Academy of Art, the Museum of Art, a Technological and Industrial School, the Museum of Natural History, the Academy of Music, an Exhibition Hall and an Assembly Hall. Says Mr. Burnham: 'These buildings, composed in esthetic and economical relation, should face on the avenue forming the perimeter of distribution and on the radial arteries within, and in particular, on the public places formed by their intersection, and should have on all sides extensive settings, contributing to public rest and recreation and adapted to celebrations, etc.' As to its architecture: 'It must be vigorous if it is to hold its own and dominate the exaggerated sky-line of its surroundings. The climate of San Francisco admits of a bold style of architecture, for the atmosphere softens profiles and silhouettes. The column should be freely used as the governing motif.'

"The acquisition of the land necessary for the Civic Center is still quite practicable, as the property is residential and moderate in price, covered mostly with frame buildings. The Civic Center is the hub, from which all spokes of communication will start and converge. Mr. Burnham suggests that a grand vestibule to the city—the Union Railway Station—should be

placed on the chief radial line from it. Thus located the Union Station will be not more than ten minutes' ride from the city's center.

"This chief radial line, striking south and west from the Civic Center, will be the Mission Boulevard, to meet the proposed reconstructed Camino Real, the old King's Highway, which traverses California north and south. As many more of these radial arteries are proposed as will be necessary for perfect inter-communication. They will all lead to the grand circular boulevard, the "periphery of communication," which will enclose the circumference of the city, a distance of thirty miles. Says Mr. Burnham: 'To this embracing highway all streets will lead and access may be had from any one of them to another lying in a distant section by going out to this engirdling boulevard and following it until the street sought opens into it. It should be a broad, dignified and continuous driveway, skirting the water edge and passing completely around the city. It should wind in and out, following easy contours and grades. At some points the Pacific will be disclosed, at others the beautiful Laguna County, with its gemlike water and its boundaries of high hills —like the high driveways beside the sea at Monterey and Bar Harbor.'

"Golden Gate Park, lying on the city's western edge, comes down on the east with its 'panhandle' to within fourteen blocks of Van Ness avenue. A few years ago Mayor Phelan started a movement for the city to purchase this intervening space, fourteen blocks long and two wide, and to bring the park by means of a panhandle extension down to the junction of Van Ness avenue and Market street, the heart of the city. Bonds were voted, but declared invalid by the Supreme Court on a legal technicality. Mr. Burnham plans great things for the Panhandle Extension, and declares it to be of supreme importance. By it Market street and the Civic Center will have direct communication with the city's main park. Bonds have been voted and will be used to connect with a boulevard the park and the Presidio (United States Military Reservation), a beautiful and extensive tract which parallels the park on the northern boundary of the city. Thence there already exists a fine drive easterly, overlooking the water, back to Van Ness avenue, completing the round trip.

"Of diagonal roads and streets Mr. Burnham has made ample provision, always bearing in mind, however, that the rectangular arrangement must be upset as little as possible. For the hilly districts he has planned a system of contour roads at various levels, connected by inclined plane at easy grades. In places too steep for building, he recommends that park space should be interwoven with the houses; belvederes built, and the summits crowned with foliage in the form of gardens or parks. Such treatment would work a veritable transformation in the best residence district and the hills of the Western Addition overlooking the bay and ocean.

"The city is already fairly well supplied with squares, and more have been provided for in the recent bond issue. Mr. Burnham proposes an increased number to meet future requirements, well distributed so as to cover the southern and poorer residence district. The exact sites should be chosen with a view to emphasizing their importance. The treatment should be in accordance with one general ideal, but individuality should nevertheless be preserved. In addition to the ordinary city squares, there is proposed a park for Telegraph Hill, a noted landmark overlooking the docks and shipping and the entire bay. Drill grounds are proposed for the Presidio, and a great terrace on the west, commanding an unrivaled view of the Golden Gate.

"As to the play-grounds, an ample provision has also been made. Their location is to be governed by density of population. They should be arranged for men, women and children, and they must be useful at all times and at all seasons. The scope of the play-grounds is wide; including social and athletic

halls, swimming pools, dressing booths, etc. On the northern water front there are planned open bay swimming, recreation piers and yacht harbors. Thus for the San Franciscan of the next generation and his children will be minimized the disadvantage to bodily development that city life entails.

"Mr. Burnham's plans comprehend a treatment of the many beautiful eminences, to enhance both their artistic possibilities and their accessibility. Their tops are to be preserved, as much as possible, in a state of nature, and their slopes covered with trees and planted verdure. These hilltop parks are to have playgrounds for children, commanding beautiful and extensive views of the city. Mr. Burnham has the fine conception that children playing amid such surroundings and with such an outlook will thus from their earliest years receive an unconscious but valuable esthetic training.

"San Francisco is a city of one street. There is no parallel in the world where one street has so much importance as Market street, broad and straight and nearly level, ending abruptly at Twin Peaks. But Mr. Burnham has conceived the idea of not permitting Market street to stop there. He will have it skirt the hills until it reaches the top and thence descend by a broad boulevard system, with many beautiful sweeps, past Lake Merced, joining finally the great circular boulevard. The esthetic and practical advantages of Twin Peaks have been overlooked, perhaps because this eminence is one of the most common sights of the city—ever present to those who throng the city's thoroughfare. But Mr. Burnham has much to say of and to do with Twin Peaks, which will become not only a public park, but a centre for great public fetes, in which the natural beauties of the city and county would be the chief attraction.

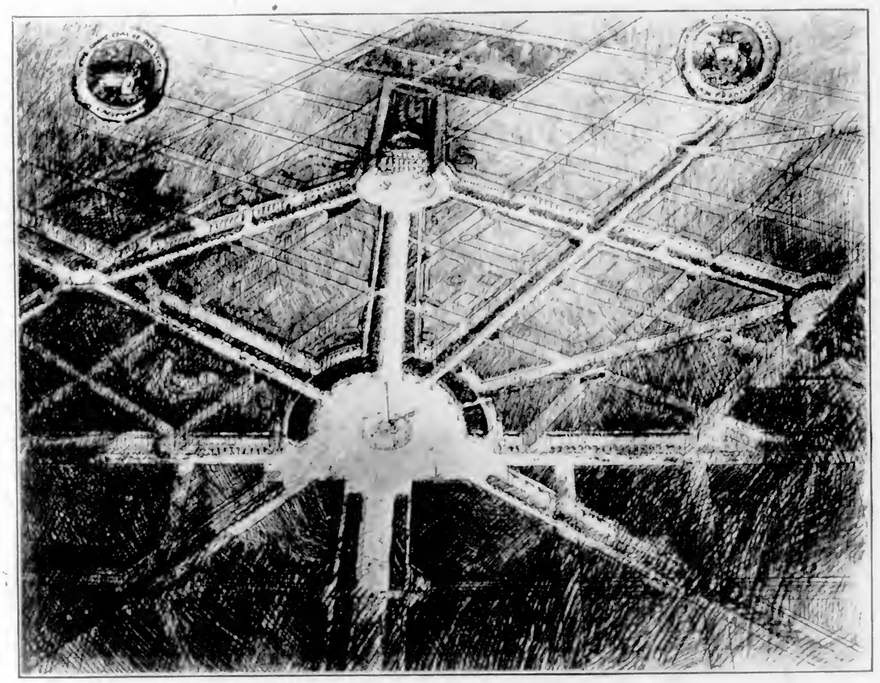
"Just back of Twin Peaks is a large, natural amphitheatre, amid groves of trees, recalling by location the Stadium in the hills at Delphi. This is suitable for horse shows, polo matches, football, etc. Nearby will be located an Academy for the accommodation of men in various intellectual and artistic pursuits. High in the hills grouped about is a sight for an Athenaeum, which will receive a few of the city's chief art treasures. The Athenaeum will consist of courts, terraces and colonaded shelters.

"While planning thus for the largest and most beautiful effects, Mr. Burnham has not neglected the smaller and more practical details. He would have grass and the bright-hued flowers which bloom so profusely in San Francisco planted to hide the ugliness of the fences. He would have small and suitable evergreen trees planted along the curbs. He says that the warmth may be increased and the wind and dust decreased by liberal tree planting, which has been hitherto generally neglected, as San Franciscans do not wish to cut off any sun warmth, of which they never have too much.

"An Art Commission is proposed to have charge of all matters pertaining to civic art and a partial list of matters for their control is enumerated: Public electric and gas poles and lamps, letter and fire alarm boxes, safety stations, street name plates, electric signs, shop fronts, bill boards, etc. He would also vest in this commission some control over domestic architecture, with respect to the general effect on the unity of the block. Also the cornice height of buildings in the business districts; pavements, curbs, signs, monuments, fountains, etc. The restriction of heavy traffic is recommended to the care of another special commission, which should also aim at measures to facilitate communication and avoid congestion. Such matters as the location of hospitals and of the almshouse, the location and arrangement of cemeteries, increased dockage facilities, etc., are gone into.

"All this which has been sketched is a large contract for even a large city to undertake. It would mean besides the doing of many new things, the more difficult overturning and undoing of much that has been done imperfectly or

wrongly. Mr. Burnham does not minimize this. He has said: 'It will take more years than we will live; it will take more millions than we can guess.' But San Francisco is willing—that is the point. She is conscious of a great future. She is willing and ready to tax herself to meet it. Says Mr. Burnham: 'We must not forget what San Francisco has become in ten years—what it is still further to become. The city looks toward a sure future wherein it will possess in inhabitants and money many times what it has now. It follows that we must not found the scheme on what the city is, so much as on what it is to be. We must remember that a meagre plan will fall short of perfect achievement, while a great one will yield large results, even if it is never fully realized. Our purpose, therefore, is to stop at no line within the limits of practicability. Our scope must embrace the possibilities of development of the next fifty years.' And again: 'It is not to be supposed that all the work indicated can or ought to be carried out at once, or even in the near future. A plan beautiful and comprehensive enough for San Francisco can only be executed by degrees, as the growth of the community demands and as its financial ability allows.'"



Civic Center and Its Various Elements *D. H. Burnham, Designer* C-339

Painting*

A GOOD painter will often get better results with a fair paint than a poor workman will get with a praiseworthy one. The method of application is about as important as the quality of the paint used, for the reason that a layer of air and water which it may hold exists upon all surfaces. This layer of air prevents close adherence of the paint to the surface, and it can only be gotten rid of by thoroughly brushing the paint out onto the surface and into the body of the material underneath. A distinguished British painter and author writes: "The less paint that is put on at each operation, consistently with a proper covering of the ground, the better will the ultimate result be. Less paint and more painting," he impresses as a need "to quite 90 per cent of his painter students." The personal equation always counts in painting as it does in almost everything else. From experiments with an ocular micrometer in connection with a microscope, we find that single coats of the same paint may vary in thickness from 1-500 inch to 1-1000 inch. The variations in thickness from these extremes and intermediate points are due to the varying pressure of the brush under the hands of the painter. Much of the poor work done nowadays results from the quality of the tools purchased by or supplied to the painters. We insist that a good workman to do good work must have good tools to work with; that is, brushes not over 3½ inches wide and full or thick with good, stiff bristles. For the highest class of work we prefer what they call down East "pound brushes"—that is, round brushes with good, stiff okatka bristles in them, not less than six inches long. With one of these properly bridled, a painter can do more and better work in a day than it is possible for him to do with the ordinary flat brush that is usually furnished him, and which costs little less. The good workman will always pay special attention to the coating of edges, and those parts of a structure where water and dirt will lodge, and to the filling in of all crevices, beads and mouldings to prevent the incursion of water. These hidden parts are often the vital ones in bridges or in buildings of steel-cage construction, and they are those which should have the most vigilant and constant attention.

The durability of paint will be affected by the number of coats applied—e. g., two coats of paint will wear better than one; three coats of paint will wear better than two and four coats of paint will wear better than three. The theory upon which we design coatings, both for wood and for metal, is, that the primer or foundation coat should be considered as structural material whose function is both to exclude air and moisture from the material underneath it and to form a receptive surface for subsequent coats. It is further our theory that in the sequence of coats this primer or foundation coat should dry more quickly and harder than any one covering it. Where it is desired to finish a structure in white, or in a light tint composed largely of a white pigment, we have reason to infer that it is wise to limit the number of coatings applied to three, exclusive of the primer; the reason for this limitation being that our knowledge includes no inert pigment which, when used alone with linseed oil, will have sufficient hiding power to serve as a satisfactory paint pigment. The consequence is that to produce a good paint in white or some light tint it is necessary to use pigments like white-lead or zinc-white that react with the oil and continuously weaken it until its power as a binder is finally destroyed. With paints made from inert pigments

*Extract from a paper by Mr. Houston Lowe read before the Engineers' Society of Western Pennsylvania.

and linseed oil it is undoubtedly true that, provided a sufficient interval be allowed to elapse after each coat for it to dry and harden, the greater the number of coats and the greater the total thickness of the layer, the greater will be the degree of impermeability to air and moisture, and also the greater the degree of resistance to atmospheric influences.

Linseed oil in drying takes something from the air—viz., oxygen—and gives off something to the air—viz., carbon-dioxide and water. Mulder describs the process beautifully and calls it "the breathing of the drying oils." The things favorable to the drying of oil paints are light, pure, dry air and moderate artificial heat. The things unfavorable to the drying of all paints are a humid atmosphere, darkness, noxious gases and low temperature. The amount of time which should be allowed to elapse between coatings of any given oil-paint will vary so much with the location of the structure, the kind and condition of the surface, the quality of the paint, the atmospheric conditions when the painting is done, and for the first few days after it is done, that it is obvious no set period of time can be named. However, a painter who is interested in his work can always determine whether one coating is fit to receive another by noting its lustre, the time when the paint no longer sticks to the dry skin of the finger, and the time when the layer cannot be moved under heavy pressure. Blistering, cracking and peeling of paint are often due to the fact that under-coats were too elastic when they were painted over. If a piece of work be painted coat upon coat of oil color before each coat is sufficiently dry, the movement and shifting of the under-coats in their effort to obtain oxygen for their proper hardening will either rupture—i. e., crack—the top coats or lift them up in the form of blisters. Pearce, in his excellent book on painting, says that four days is not too much to allow for the proper drying of oil color which will nominally dry in twenty-four hours. The period may be shortened by additional driers; but a good rule is to allow all paint to stand four times as long as it takes to arrive at superficial dryness.

C. W. McCall, Architect C-340

The Architectural League of America

Announcement of a Competition for a Foreign Traveling Scholarship.

UPON the result of this competition will be awarded a Scholarship in Architecture, allowing the recipient $1,200, to be spent in foreign travel under conditions outlined below:

A competitor must be under the age of 35 years at the date given for the preliminary competition.

He must have been a member of one of the architectural organizations constituting The Architectural League of America for a period of six months prior to the date of the first competition.

He must not be in the active practice of Architecture either alone or as a member of a firm at the time of the competition.

The fact that a member has once been a practitioner, but has since relinquished his practice will not debar him from the competition.

PRELIMINARY COMPETITION.

February 25th, 9 A. M.—9 P. M.

The officers of each club will designate a place in their city where this competition will be held and will also appoint a member of their club to act as an officer in charge of the competition.

Competitors will report at the designated place and to the officer in charge, at the time mentioned, and each will come provided with materials and instruments necessary to prepare sketches of a problem in design the subject of which will be given them upon their arrival.

No competitor will be allowed to leave the premises during the twelve hours given for the completion of his design except that he surrender finally his drawings to the officer in charge.

Each competitor will on or before the expiration of the twelve hours hand in his drawings, signed with his full name, address and name of club, and these will be forwarded by the officer in charge to the Secretary of the Architectural League of America.

A competitor must also keep a complete set of tracings of his design for his future reference.

Drawings to be in the hands of the Secretary of the Architectural League of America on or before April 24th, 1906.

The competitors in the preliminary competition will develope the design submitted and present the drawings called for in the "Programme of the Competition" given them at the time of the preliminary competition.

These drawings will be signed with the author's full name, address and name of Club of which he is a member, and must be accompanied by a sworn affidavit that they are the unaided work of his own hand.

Each competitor will present with his final drawings an essay of not more than 2,500 words in which he will state what he considers to be the chief function of such a scholarship as this one. What advantage he expects to gain from it in case he should win it, and what, if any, are his special predilections toward architecture. This essay to be typewritten on manuscript paper.

The drawings submitted in this competition will be judged by three representative architects selected from different localities. The judges will be named on the programme.

In making out the itinerary the committee having the competition in charge will endeavor to consider the personality and inclinations of the winner in as large a degree as seems to them reasonable and in the best interest of the scholarship.

In the programme of study the above will also hold true, but the winner will be required to specially observe and report, as directed, on some subject which will be designated relating to the improvement of cities.

The member awarded this scholarship must avail himself of its advantages within six months after the award is made, and will be required to spend not less than one year, nor more than fourteen months in foreign travel, according to the route laid out for him.

All other necessary information will be contained in the "Programme of the Competition."

Further details are given in the following letter by President N. Max Dunning:

"It is desired to call your attention to the three scholarships above mentioned, and to lay particular stress at this time upon the great value of the one scholarship for regular standing, to be awarded to that member of The Architectural League of America passing the highest entrance examinations as hereinafter described.

"It should be made the duty of the officers of each of the clubs constituting The League to impress upon the younger members the importance of this scholarship. In doing so it would be well, it seems to me, to either have the matter brought up and commented upon at one of your meetings, or to advise your members of the opportunities thus offered, setting forth in your statement the splendid advantages that this scholarship will provide for ambitious young men desirous of securing an education in architecture.

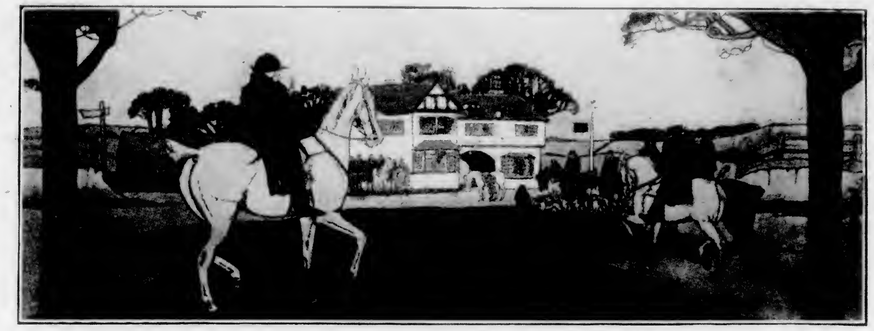
"In presenting this matter to your members, the fact should not be lost sight of that an opportunity to attend Harvard University means far more than the mere architectural training a man will receive. He will enjoy an atmosphere of culture and will have opportunities of attending lectures on many subjects apart from these included in the curriculum of architecture. He will have the use of the splendid libraries and will be thrown among those influences which make for a greater culture and a more intelligent appreciation of the relation of his future work to wider interests.

"The regular entrance examinations, upon the result of which this scholarship for "Regular Standing" will be awarded, will take place in June and September in most of the large cities of the United States.

"Any member desiring to compete for this scholarship should forward his name, as a League Member, to Professor H. Langford Warren, Department of Architecture, Harvard University, and also write to Mr. James Lee Love, Secretary of the Lawrence Scientific School, Cambridge, Mass., who will forward him a catalogue and all necessary information pertaining to the requirements for admission and examination.

"You will realize the importance of placing this information before your members immediately, in order to secure the best results, as a good many of the young men who would be anxious to avail themselves of this opportunity will require some preparation before they will be ready to take the entrance examinations in June or September.

"A young man winning this scholarship for regular standing may, at the discretion of the Architectural Department of Harvard University, at the end of his first year, be awarded one of the Special Scholarships which would give him free tuition during the second year. At that time he will be competent to enter any of the numerous regular scholarships provided by Harvard University.



Interior Decoration
Up-to-Date Furnishing

New Art in Decorative Work

By C. WALTER TOZER

THE general prosperous condition of the people in general throughout the whole country is leading them to devote their attention and money to the subject of interior decoration. The demand for the better grade of goods is greater than ever before, and this encouragement has compelled the manufacturers of decorative goods to put forth every effort to produce the best. To-day sees some wonderfully beautiful paper-hangings and wall-coverings being placed on the market. The past few years have brought some radical changes in the decoration of homes.

A generation ago a highly colored and richly patterned wall paper was considered all sufficient, and the harmony and fitness of color and design were often of secondary consideration.

Then came the "tinting and painting" period, where the exasperating red hall and green dining room, or else the green hall and red dining room, were found in every instance. If the walls were not tinted then the plain ingrain papers were used instead. In either case there was little or no opportunity for originality and variety.

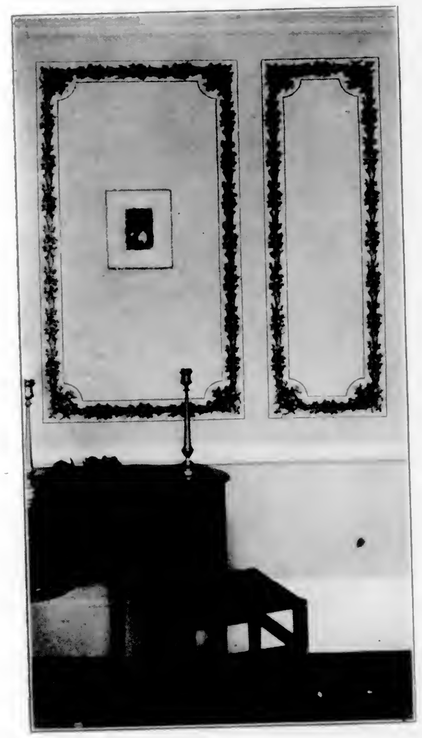
Our desire for individuality has been recognized and is being carefully fostered.

The trend at the present time is away from the brilliant colors to the soft, rich tones; away from the set geometrical figures to those with beautiful flowing lines; away from the hard outlines to those softened by the use of two or more tones of the same color, and above all, from the small, hard and fixed repeat to one made as imperceptible as possible by many devices.

The methods at our command are now varied for making our rooms peculiar to ourselves. We have the opportunity of dividing up our walls in different ways; the wainscot, the side-wall and the frieze; or we have the lower two-thirds divided by a plate-rail from the upper third, or the lower third cut off by the chair rail from the upper two-thirds. The wainscot also often divides it in halves. Another arrangement very popular is the panel decoration. This effect is produced in a great many harmonious combinations, and w can combine them to suit ourselves and our rooms, having no fear that our neighbors, confronted with different conditions, will happen to strike the same combination.

There are many interesting designs for the two-thirds treatment, either in art nouveau trees or vines, the long lines forming panels, their blossoms and foliage a crown frieze, or naturally growing flowers, their blossoms forming a crown for a wall of leaves. There is one of these effects with the poppy as the motif. Long stems, covered with the natural leaf growth, running up four or five feet above a wainscot. The large, bold poppy blossoms forming a crown frieze, and back and above these a faint suggestion of landscape and sky.

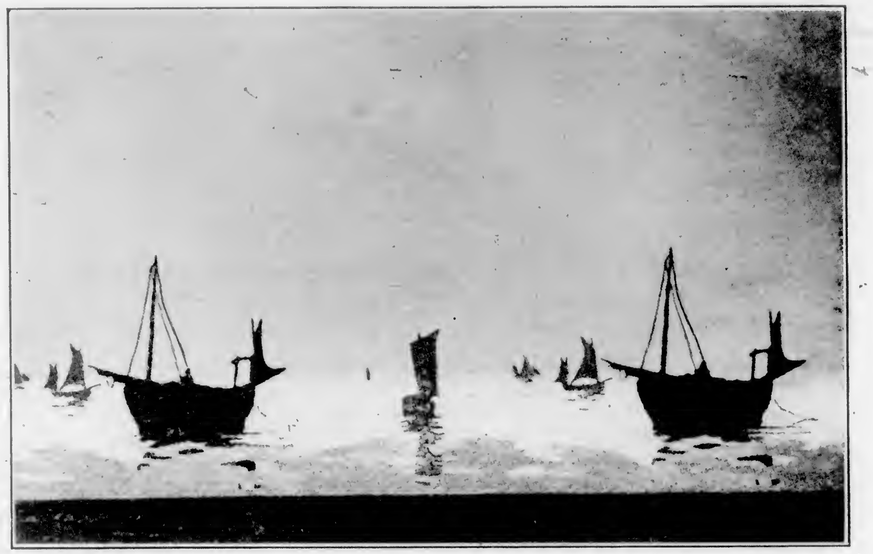
Quite different from these ultra-naturalistic papers and much pleasanter to live with for more than a brief interval of time, are the conventionalized papers, those embodying the theory that plant forms in their natural state are not adapted to the ornamentation of flat surfaces; that the colors must all be laid on in flat tones, without the slightest effort at relief. Different rooms naturally require designs based upon different principles. Conventionalized drawings are best suited to libraries, dining rooms and halls. They come in either two or three tones of the same color or in two or three different tones of two or possibly three contrasting colors. The two-toned papers are desirable anywhere and in any proportion; a whole wall, a half or a third.



A Panel Treatment C 310

Where the colors, however, are contrasting an entire wall is very often too much. In which case they should be confined to an upper third or frieze treatment. In all cases the use of a design based upon a very large motif must be conditional upon the size of the room.

The subject of friezes has become a very fascinating one. There are now so many beautiful friezes upon the market. The landscape frieze, with trees sharply outlined against the sky; then the soft toned landscapes and marines, and not the least the many charming nursery friezes. One of the beautiful landscape friezes is "The Survey." It represents a bit of English scenery with tall, slim ostrich trees in the foreground. The whole of the picture is sharply defined with the predominating tones in olive green. A group of the



The "Ebb Tide" Frieze C-311

trees run about every four feet with low shrubbery at their bases. These are suggested by broad washes of dull olive. The trunks of the trees are also washed in the same shade of olive. The foliage at the tops are washed in burnt orange blended from the olive. There are glimpses of hills and close-cropped shrubbery in the background, in tones of olive, nile and burnt orange fading away into tones of gray-purple. The sky is beautifully clouded in wash blends of pale purplish orange and cream. This frieze could be used to admirable advantage in any large reception hall, dining-room or living-room, where the color scheme was carried out in the same tones, or even in a large bedroom where the ceiling was very high and the wall space broad.

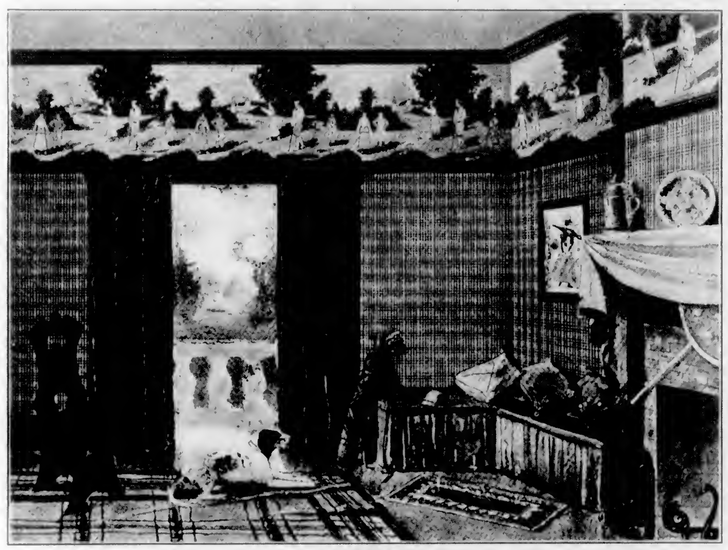
Another very effective frieze is a marine view called the "Ebb Tide." In the luminous tones of sea and sky and the wavering reflections of the boats lying at anchor, the water color effect is very natural, as there is ample opportunity for broad masses washed in light transparent tones. It is a very restful and simple design—only a few fishing boats in the foreground, some at anchor and others with sails set, departing on their missions. This frieze comes in several colorings, three of which represent sunrise, noon and sunset. The most effective, however, for general use is the coloring in soft yellowish green. Here the separation of the water and sky lines is hardly perceptible. In this particular coloring the frieze is appropriate for reception halls, dining-rooms and libraries, or even bed rooms of good dimensions. In the other colorings, however, its use should be confined to rooms that are not lived in constantly, such as halls or dining-rooms.

✣ ✣ ✣

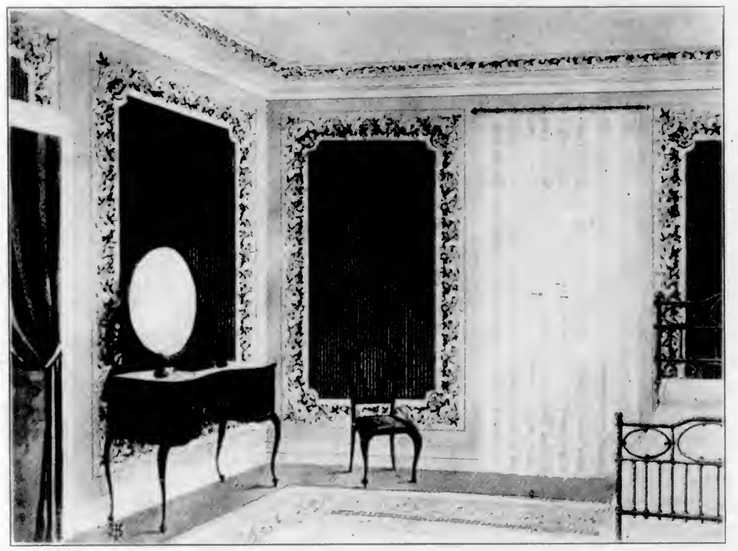
A man who is a friend only to himself has but few friends.

✣ ✣ ✣

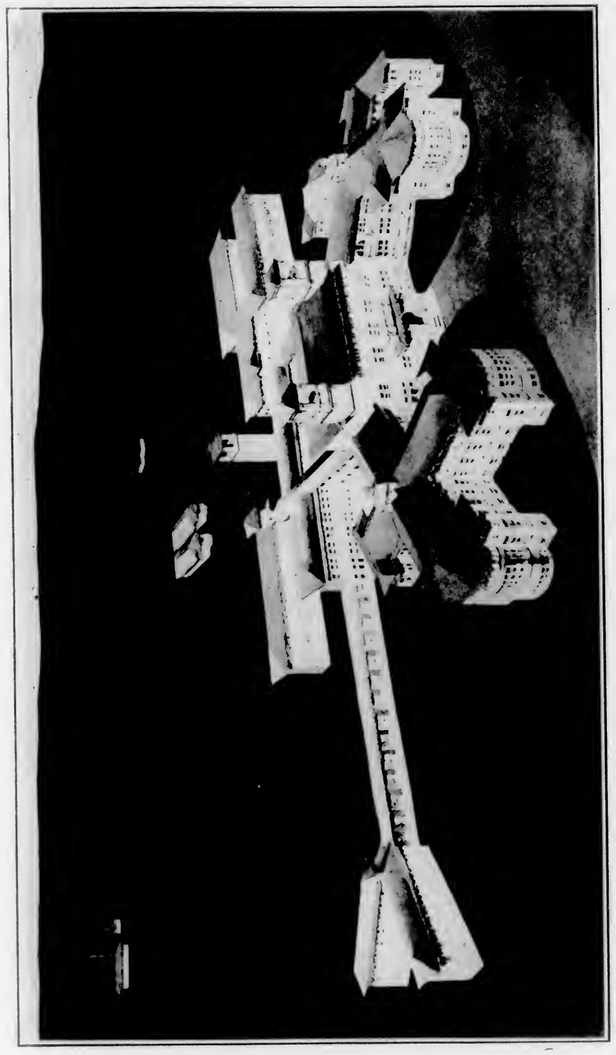
An undertaker never complains that he is worked to death.



Decorative Suggestion for Country Home — *L. Tozer & Son Co.* C-342

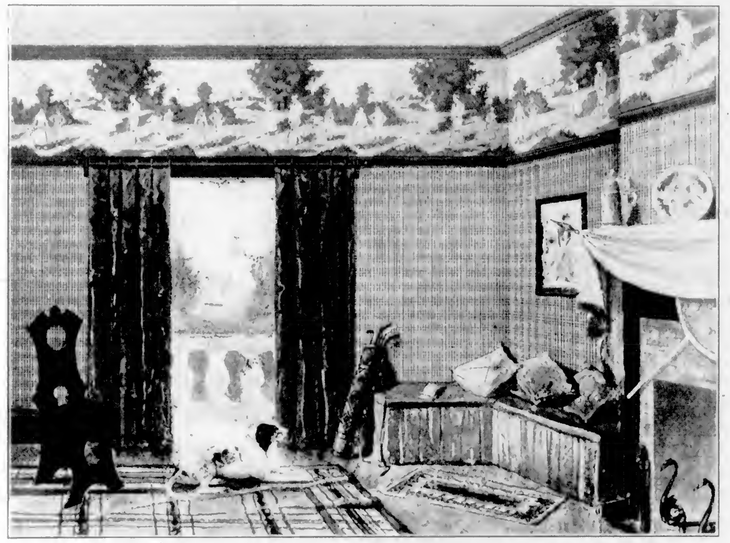


A Panel Treatment — *L. Tozer & Son Co.* C-343

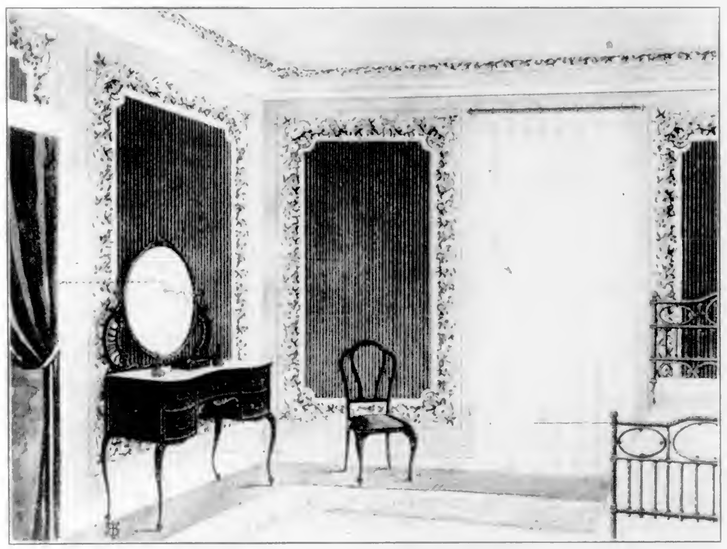


William Knowles, Architect C-344

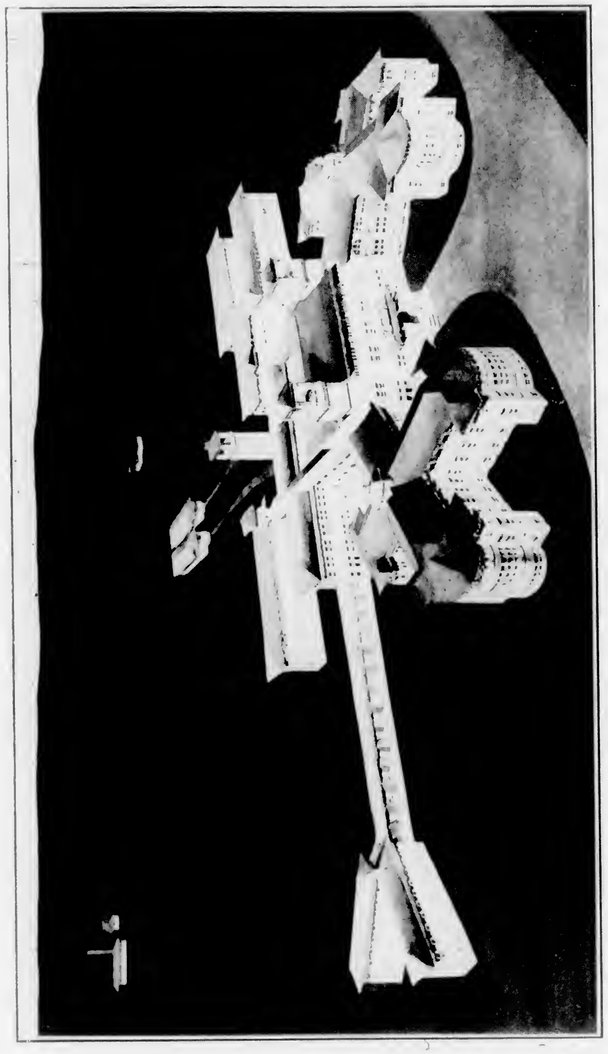
Unique Design for Hospital



Decorative Suggestion for Country Home *L. Tozer & Son Co. C-342*



A Panel Treatment *L. Tozer & Son Co. C-343*



William Knox, Jr., Architect C-344

Unique Design for Hospital

R. B. Burns, Chief Engineer C.345
C. A. Morse, Acting Chief Engineer

Santa Fe Passenger Depot at Ash Fork, Ariz.
Harrison Albright, Architect

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession :: :: ::

Architect Henry A. Schulze has been in the East getting ideas for the proposed enlargement of the Olympic Club's building. The structure is to be raised several stories.

Architect A. Dodge Coplin, formerly of Oakland and later opened an office in the James Flood building, San Francisco, has removed to New York City.

Architect A. F. Rosenbaum of Los Angeles has been East on an important business trip.

Arthur Brown, Jr., and Henry A. Schulze have dissolved partnership, and Mr. Brown has formed a partnership with John Bakewell with offices at 731 Sutter street.

Architect William Curlett has moved his offices further west in the Phelan building where there is more available room. The offices of the State Board and San Francisco Chapter, A. I. of A., have not been changed.

The plans of C. W. Dickey of Oakland for a $250,000 family hotel to be built at Claremont have been approved. The hotel is to be four stories high and will contain 200 rooms. Old English will be the type of architecture.

It is likely that the new Scottish Rite Temple to be built in Oakland from plans drawn by Architect C. W. Dickey will be of reinforced concrete. This will be the first building of any pretentions to be built of reinforced concrete in Northern California.

A commission has been appointed to revise the city ordinances in Los Angeles affecting reinforced concrete construction. The commission is composed of Charles F. Whittlesey, chairman; W. S. Osborne, Joseph Simons and C. J. Kubach.

The Southern California Chapter of the American Institute of Architects held its regular monthly meeting January 9th in the Cafe Bristol. Besides the regular business, the following were elected to membership: Thornton Fitzhugh and N. St. Clair to be regular members, and P. A. Eisen a junior member. A committee consisting of John P. Krempel, Octavius Morgan and John Parkinson was appointed to consider the feasibility of acquiring property to build a home for the Chapter.

Attention is called to the classes being conducted under the auspices of the San Francisco Architectural Club. There are three classes as follows: Pen and Ink Rendering, Beaux Arts and Structural Steel, instructed respectively by Mr. A. O. Johnson, Mr. Charles Peter Weeks and Mr. Charles F. Archer. Each course is so arranged that new students may join at any time. The S. F. A. C. have not spared expense or trouble in order to make these classes a success and of benefit to the profession. Every draughtsman will find some benefit resulting from his attendance. The instructors are practical men and are teaching these classes the things they encounter in the course of each day's work.

Certificates were issued at the last meeting of the State Board of Architecture to A. C. Smith, 307 S. Broadway, Los Angeles, and H. Alban Reeves, Chamber of Commerce building, Los Angeles, they having qualified to practice architecture in the State by taking the examinations.

Stone & Smith, architects, in the new James Flood building, have outgrown their qaurters and on the 1st of March will move to suite 59 at 809 Market street.

Building Reports

High school, Bakersfield, Cal. Architects, Stone & Smith, Jas. Flood building, San Francisco. Cost, $50,000. Owner, City of Bakersfield. Plans of Stone & Smith.

Sealed bids will be received by the board of supervisors of Los Angeles county until 2 p. m., February 20th, for the complete construction of jail in Newhall, to be built

in accordance with plans and specifications on file in office of supervisors, Los Angeles, and open to inspection to bidders.

Residence, W. Los Robles avenue, Pasadena. Architect, C. W. Buchanan, 99 E. Colorado street, Pasadena. Owner, John Haynes. Building will be two-story, ten rooms. Frame and cobble stone. Balconies in front and rear. Will be finished first-class throughout. Extra fine plumbing. Heated with hot air furnace.

Flour mill. Architect, C. W. Buchanan, 99 E. Colorado street, Pasadena, Cal. Owner, J. B. Cole. Building will be of brick, 60x100 feet, three stories and basement under 60 feet. Will be fitted with modern flouring machinery. Power not definitely decided; will be either steam or electricity.

Residence, S. Pasadena avenue, adjoining the residence of ex-Gov. K. Markham. Architect, C. F. Driscoll, 26 E. Colorado street, Pasadena. Owners, Mrs. M. F. Thayer, Madison avenue, Pasadena. The building will be frame, two stories, twelve rooms, finished first class. Hot air furnace. Contracts are now being figured.

Addition, Columbia building, Los Angeles. The lot is 62½ feet front by 155 feet deep, with a two-story brick business building at 612-618 S. Broadway. The walls are of sufficient strength to sustain the weight of three additional stories which will soon be added to the building.

Residence, 1006 Alvarado street, Los Angeles. Designer, Miss Lillian Tate, 414 O. T. Johnson building, Los Angeles. Owner, Mrs. Harris. The building is to be erected by Abner L. Ross and will be Mission in style, containing ten rooms; modern equipment throughout.

Cottages, Walton, Cal. Designer, Miss Lillian Tate, 414 O. T. Johnson building, Los Angeles. Owner, A. F. Johns. Miss Tate is preparing designs for six frame cottages, one of which will be used by Mrs. Johns for residence and will have hot air furnace.

Residence, Los Angeles. Architect, H. M. Patterson, 327 O. T. Johnson building, Los Angeles. Owner, Eugene Neff. The residence will be a one and one-half story frame building.

Office building, 343 W. Third street, Los Angeles. Architects, Dennis & Farwell, 301 Currier building, Los Angeles. Owner W. S. Collins, 701 O. T. Johnson building. A five-story office building will be erected on Third street, the material to be used for the building not yet definitely decided. It will be reinforced concrete or steel and brick.

School building, Berkeley. The plans for a new $50,000 school building at Berkeley, prepared by W. H. Wharff, have been rejected by the trustees and new plans will be called for. The bids exceeded the amount authorized by the trustees by several thousand dollars.

Three-story business block, Berkeley. Architect, A. H. Broad, Berkeley. Owner, J. W. Haven. Cost, $25,000. This building is to replace the one burned on Shattuck avenue two months ago. No contracts have been let yet. All the debris has been cleaned from the site and the excavating is under way.

Ten-story office building, Market street, San Francisco. Architect, William Helbing, Parrott building, San Francisco. Owner, William Helbing. Cost, $400,000. This building is to be class "A," fireproof, steel and brick, for stores and offices.

County and City Hospital, San Francisco. The board of supervisors of San Francisco have voted to build a new city and county hospital, and plans for the same will be prepared immediately by the city architects, Shea & Shea.

French flats, Burlingame. Architects, Wright & Polk, San Francisco. Owner's name withheld for present. Plans for a number of beautiful French and Italian flats to be built in Burlingame are being made in the office of Wright & Polk. They are to cost from $5,000 to $10,000.

Apartments, Fifteenth and Magnolia streets, Los Angeles. Architect, S. Tilden Norton, Los Angeles. Cost, $6,500. Owner, J. Korn. Contract just let for two frame apartment buildings, six and seven rooms.

Apartments, 10th and Valencia streets, Los Angeles. Architect, S. Tilden Norton, Los Angeles. Cost, $5,000. Owner, H. Q. Klein. Plans call for two six-room frame apartment buildings. The contracts are just let.

Depot, Los Angeles. Cost, $500,000. The Arcade depot of Los Angeles will be replaced by a Mission style structure for the use of both the Salt Lake and Southern Pacific railroads. Work is to be begun within the next thirty days.

Office building, Broadway, between Seventh and Eighth streets, Los Angeles. Architects, Morgan & Walls, 234 N. Main street, Los Angeles. Bids are now being figured and general contract will soon be let for the New Mark building, a brick and steel office building.

Morgan & Walls are also receiving bids for the elevators, marble and general inside work for the building for I. W. Hellman, corner of Fourth and Main streets. C. Leonardt is the general contractor.

Stone business block, Mountain View, Architects, Wolf & McKenzie, San Jose. Owner, George Swall, Mountain View. Cost, $7,000. Building will be two stories, sandstone front, three stores and offices; galvanized iron cornice; iron frame. Plans and specifications ready.

Alterations and addition to State Capitol, Sacramento. Architects, Sutton & Weeks, San Francisco. Engineers, Breite & Archer. Bids for the erection of the building are being received. The contracts are to be let in seven sections. The total cost of the improvements is estimated at $350,000. About 300 tons of iron and steel are to be used.

Remodeling Hughes Hotel, Fresno, Cal. Architects, McDougall Bros. Cost, $20,000. Work to consist of new dining rooms, office, palm court, grill, and remodeling entire second floor.

Residence, Fresno, Cal. Architect, E. Matheson. Cost, about $10,000. Plans are being made for a two-story, ten-room, classic style residence, to be built of concrete blocks. Mr. F. Osborn, owner.

School house, Red Bluff. Architects, Stone & Smith, Jas. Flood building, San Francisco. Cost, $27,000. Bids are now being taken for two-story and basement brick and stone building to contain ten rooms.

Bank building, Haywards. Architect, D. Franklin Oliver, 909 Jas. Flood building, San Francisco. Plans are being prepared in Mr. Oliver's office for a substantial three-story bank building to be erected by the bank at Haywards.

Postoffice building, Mountain View. Architects, Wolf & McKenzie, San Jose. Cost, $9,000. Owners, Rogers & Rogers, of Mountain View. Building is to be of brick with plaster, Mission style, two stories, one store and postoffice; offices on second floor. No contracts let yet.

Business building Grant avenue and Post street, San Francisco. Architect, Herman Barth, Montgomery street, San Francisco. Owner, I. Magnin & Co. Cost, $100,000. This building will be of sandstone and will be for the exclusive use of the owner. It will be six stories high. The size of the lot is 60x102 feet.

Freight sheds, San Francisco. Owner, Santa Fe railroad. Orders have been given to begin at once the erection of wharfs freight sheds and tracks on Kentucky street. There will be two immense freight sheds, each 1,200 feet long. Kentucky street will also be paved by the railroad company.

School, Piedmont avenue, Berkeley. Architect, F. D. Voorhees, 1111 James Flood building, San Francisco. Cost, $3,500. The building will be of brick and two stories, six rooms.

Grammar school, Selma, Cal. Architects, McDougall Bros., Fresno, Cal. Cost, $20,000. The plans now being completed call for two-story brick building containing six rooms and an assembly hall.

Business block, Kingsbury, Cal. Architect, E. Matheson. Owner, J. W. Curle. Cost, $4,000. Plans will call for two-story brick building. Date of opening bids not known.

Residence, Fresno, Cal., corner of F and Amador streets. Architect, E. Matheson. Cost, $6,500. Owner, Dr. Davidson.

Bank, Lindsey, Tulare Co., Cal. Architects, McDougal Bros., Fresno, Cal. Cost, $15,000. Contractor, C. J. Lindgren. Notice of building withheld till let. Plans call for a two-story brick building with basement. Second story to be used for offices. Building to have latest improved fixtures.

Residence, Visalia. Architect, E. Matheson. Owner, L. Lawrence. Cost, $4,000. The plans call for a two-story frame building.

Bank building, Sunnyvale. Architects, Wolf & McKenzie, San Jose. Cost, $6,000. Owners, Bank of Sunnyvale, W. E. Crossman, president. Plans have been finished and estimates are being taken on a two-story building to be either of cement blocks, brick or Mission style.

Residences, Bowdish and Haste streets, Berkeley. Architect, C. W. Cook, Oakland. Cost, $4,500 each. Owner, J. A. Marshall, Berkeley. Plans are being made for six modern houses of ten rooms each; three will be Mission style, plastered exterior and tile roofs, Mission oak furniture; others will be English half timber, oak beam finish interior.

Theater, Ellis street, San Francisco. Architects, O'Brien & Werner. Cost, $75,000. Owner, Marion Leventritt, San Francisco. Reference to this building was made in these reports several weeks ago. A number of architects presented plans, and those of O'Brien & Werner have just been accepted and bids will be taken at once. The front will be of sandstone and granite, the balance of steel and brick and absolutely fireproof. The building will cover a lot 72x137½ feet.

High school, Willets, Cal. Architects, Stone & Smith, Jas. Flood Building, San Francisco. Cost, $30,000. Bids are now being taken for this building.

❖ ❖

The Architects' Directory and Specification Index for 1905-1906 is at hand. The book contains a complete list of the architects of the United States and Canada, classified by states and towns, indicating those who are members of the American Institute of Architects; also the names of the officers and locations of the different architectural associations in the United States. The book has been prepared with the greatest care to secure accuracy both in names and locations. It also contains a complete list of the landscape and naval architects of the United States and Canada, indicating who are members of the American Society of Landscape Architects; also the Society of Naval Architects and Engineers. Published annually. Seventh edition. New York: William T. Comstock. One 8vo. vol.; red cloth, stamped in white. Price, $2 net.

THE
Architect and Engineer
OF CALIFORNIA

Published Monthly in the interests of the Architects, Construction Engineers and Contractors, and the Allied Trades of the Pacific Coast by the Architect and Engineer Company.

SAN FRANCISCO AND LOS ANGELES

Terms of Subscription $1.00 per year.

Offices—215 Sansome Street, San Francisco; Telephone Davis 945.
142 Broadway, Los Angeles; Telephone Home 5747.

Press of THE HICKS-JUDD COMPANY, 21-23 First Street. *Halftones and Etchings by* CALIFORNIA PHOTO ENGRAVING COMPANY, First and Mission Streets, S. F.

Vol. IV. FEBRUARY, 1906 No. 1

EDITORIAL

REINFORCED CONCRETE ON THE PACIFIC COAST.

The local increasing demands of the business world for reinforced concrete structures bespeaks a healthful condition of this material in the West. The Pacific Coast during the past season has seen commenced, and in some cases carried to completion, some of the largest concrete structures in existence in the United States.

The facility of reinforced concrete for supplying immediate demands, coupled with the economy nearly always obtained, commends its merits to the careful consideration of architects and engineers. To the investor one of its attractive features is the ability to place a structure in an earning condition on this Coast in much less time than can be done with other materials heretofore used.

Architects and engineers are rapidly becoming aware that there is a strong public feeling tending toward the building of permanent structures. They are learning that the professional man who can convince his clients he is able to give them such a structure usually finds little or no trouble in securing the required amount for the small additional first cost that may exist between it and the more perishable types. A proper presentation to the owner of actual costs, together with maintenance expenses that must accrue on less durable materials usually show the reinforced concrete to possess the greater economy.

The universal public expressions of confidence in the durability and strength of a completed concrete structure that always occur are most gratifying to the designer and tend to convince him that it is soon to become an inevitable popular demand.

The many smaller public demands that can be supplied in concrete will enable its merits to become so thoroughly understood that it will receive hearty support in quarters that have hitherto had but a meager knowledge of construction in other materials.

HOUSES FOR THE WORKING CLASSES.

The attempt to improve the conditions of the working classes in many of the larger cities of the country is strikingly illustrated in the model homes which are being erected in New York City through the munificence of Henry Phipps, who recently donated a million dollars for the purpose.

The plans for the first of the series of model tenements, which are considered far ahead of any previously constructed, have been prepared by Grosvenor Atterbury, an architect of some distinction, and call for three units, all being identical in style and architecture. The buildings will have a combined frontage of 180 feet and a depth of 98 feet 9 inches, while the height will be six stories and basement.

The total cost of the three houses which are first to be erected will be $225,000, and it is intended to have them completed and ready for occupancy as early in the present year as possible. The design embodies many novel innovations from an intellectual as well as a sociological standpoint. In connection with the former it may be stated that none of the apartments will open directly on the street, but the entrances to the tenements will be through two large archways, each of which will measure 32 feet in length, these leading into two interior courtyards arranged with plants and playing fountains.

The construction of the buildings is to be fireproof throughout, the materials comprising concrete, brick and steel. The apartments will be supplied with steam heat, hot and cold water, a gas range, washtub, sink and toilet or a shower or tub bath. In the basement of each of the buildings will be the boilers and heating appliances, hygienic laundry and drying rooms, storage rooms, children's playrooms, a kindergarten and a garbage incinerating plant, the purpose of the latter being to consume all the refuse from the different apartments as quickly as it can be carried to the furnace below.

The front portion of the roof will be equipped as a roof garden, where two permanent pavilions for shade and protection will be erected, while the rear portion of the roof will be devoted to the drying yards. The number of rooms alloted to each family will run from two and three to four and five apiece. Perhaps the most striking innovation in connection with these new model tenements will be the conspicuous absence of the janitor, who will be superseded by an intelligent and sympathetic matron selected by the trustees, and while practically taking the place of a janitor her duties will differ materially in that she will attend to all the affairs that may be called to her attention, as well as look after the sanitary condition of the buildings. The number of rentable rooms in the entire structure will be 207, arranged in 70 apartments, of which 25 are two-room suites, with toilet and shower bath; 27 are three-room suites, similarly equipped; 14 are four-room suites, with bathrooms containing toilets and tubs, and 4 are five-room suites, with bathrooms.

❖ ❖

THE ARCHITECTURAL LEAGUE OF AMERICA.

The San Francisco Architectural Club is the latest offspring of that national family of architectural clubs known as the Architectural League of America. This is the kind of news we are always glad to record, for it means that our local draughtsmen are making a strenuous effort toward improvement. It is to be hoped that Eastern ways and methods will soon invade our architects' workrooms. They seem to have a knack back there for turning out neat, accurate and complete working drawings.

The local club would appear to be on the right track. What they need now is encouragement, and it is up to the architects of San Francisco to furnish this to them.

On another page will be found two letters from the president of the Architectural League describing the scholarships in Harvard College and a traveling scholarship in Europe that the San Francisco Club members intend to compete for this year.

The Publisher's Corner

Residence of Mr. Henry Gervais *Designed and Built by the Owner* C-346

Vacuum Sweeping Plants for Private Residences.

Heretofore, in order to thoroughly clean carpets it was necessary either to have them taken up and sent to the beaters to have them beaten by hand, or to call in the services of the compressed air and vacuum cleaning wagons, which are now working throughout the United States.

The latter method is very satisfactory.

The Sanitary Devices Manufacturing Company of San Francisco, who manufacture these carpet-cleaning wagons, have now perfected and put on the market a vacuum Sweeping plant for residences.

This plant has been specially designed for economy in space and cheapness of operation.

By referring to the cut it will be seen that the motor, pump and dust tanks are self-contained on one base.

The cost of operation is about eight cents per hour, and in one hour's time 200 yards of carpet can be thoroughly cleaned.

Any person can operate this plant. All that is necessary is to turn on the electric current to start the motor.

An especially designed oiljng system keeps the entire plant thoroughly lubricated for at least six (6) months without attention.

The wet and dry dust separating tanks thoroughly cleanse the air. The dry tank, by means of centrifugal motion and gravity, separates the heavier particles of dust, while the wet tank completes the process by passing the air current through the atomizer and a column of water, leaving the remaining matter in liquid suspension. The final removal of the dust is simple and sanitary—from the dry tank by a dumping trap-valve, and from the wet tank by drainage direct to the sewer.

The dimensions of this plant are: Length, 5 feet 2 inches; width, 3 feet 4 inches, and height, 6 feet 2 inches, so that there are few basements that have not space for this machinery.

All physicians now agree that most diseases are caused by germs. People should then realize how important it is to dispose of the dust that enters their homes and settles in their carpets and draperies.

Besides being sanitary, cleaning by vacuum process saves carpets from wear. It is not the travel on a carpet that causes it to wear out, but the grinding of sand and particles of dust into the fabric which act the same as sandpaper would on a rough surface.

Brooms appear to do good service, but examine the dust and dirt they collect and you will find that most of the dust has been driven into the carpet, and that what you remove consists of lint, very little dust and broom straw.

After sweeping, dusting is necessary. Dusting the furniture moves the dirt back to the carpets where it remains until again stirred up by the broom. The broom moves the dust to your pictures, furniture and hangings. The vacuum sweeper removes it and renders dusting unnecessary.

When sweeping by vacuum becomes universal, the percentage of sickness undoubtedly will decrease.

❖ ❖

The firm of John McGuigan & Co., whose card will be found elsewhere in this issue, are worthy of consideration on account of their long experience in the line of work they do.

We find them well-known and enjoying the confidence and patronage of many of the leading architects and contractors.

They are a progressive concern, not content with the single thought of the sufficiency of the present times, but are busy

making improvements in their lines that will be distinct advances in the part of building construction in their particular domain.

We suggest that you have this concern consider Fireproofing, Sidewalk Lights, etc., with you when in the market for such, and feel that you will be pleased with them and their work.

We learn that while they have many progressive ideas and are competent to make suggestions when requested, they make a main point in their business of adhering strictly to the specifications for, quoting them, "Specifications are made after mature consideration by the architect, and without question he knows what he wants."

❖ ❖

The San Gabriel Valley club house, drawings of which by Architects Hudson and Munsell are shown in this number, commands a picturesque sitting within sight of the historic San Gabriel mission. It is an ideal spot for an ideal country club house occupying as it does a commanding knoll in a reservation of 55 acres. Oak trees, cactus stockades, placed in position by the Indians in the early pioneer days, add to the attractiveness of the place. The golf links are unsurpassed anywhere in Southern California, while the tennis courts are the best that can be provided. A feature of the club house is the accommodations for baths, the Improved Climax Solar Water system being used.

❖ ❖

S. W. Marshall & Son of Fresno announce elsewhere in this number an exceptionally fine line of ornamental and fruit trees which doubtless will interest builders of new homes who may contemplate planting trees and shrubbery. The history of the Mr. Marshall's business dates back to 1888, when Mr. S. W. Marshall, the senior member of the firm, first launched out in the nursery business in Fresno. The firm carries a very complete line of fruit and ornamental trees, shrubs and vines, roses and general horticultural requisites, and visitors desiring to visit and inspect the stock are shown every courtesy.

The firm of Breite & Archer, structural engineers, with offices at 508 California street, has dissolved partnership, C. F. Archer retiring. Both young men are civil engineers of high standing on the Pacific Coast, and since entering the local field together have made many friends. Mr. W. W. Breite will continue the business of the firm, assuming all liabilities and assets.

❖ ❖

The San Francisco Architectural Club has elected officers for the year 1906 as follows: President, H. G. Corwin; vice-president, W. H. Crim, Jr.; treasurer, A. R. Johnson; secretary, M. A. Schmedlin.

Directors—Toby Beauwald, E. B. Scott, W. D. Sherman.

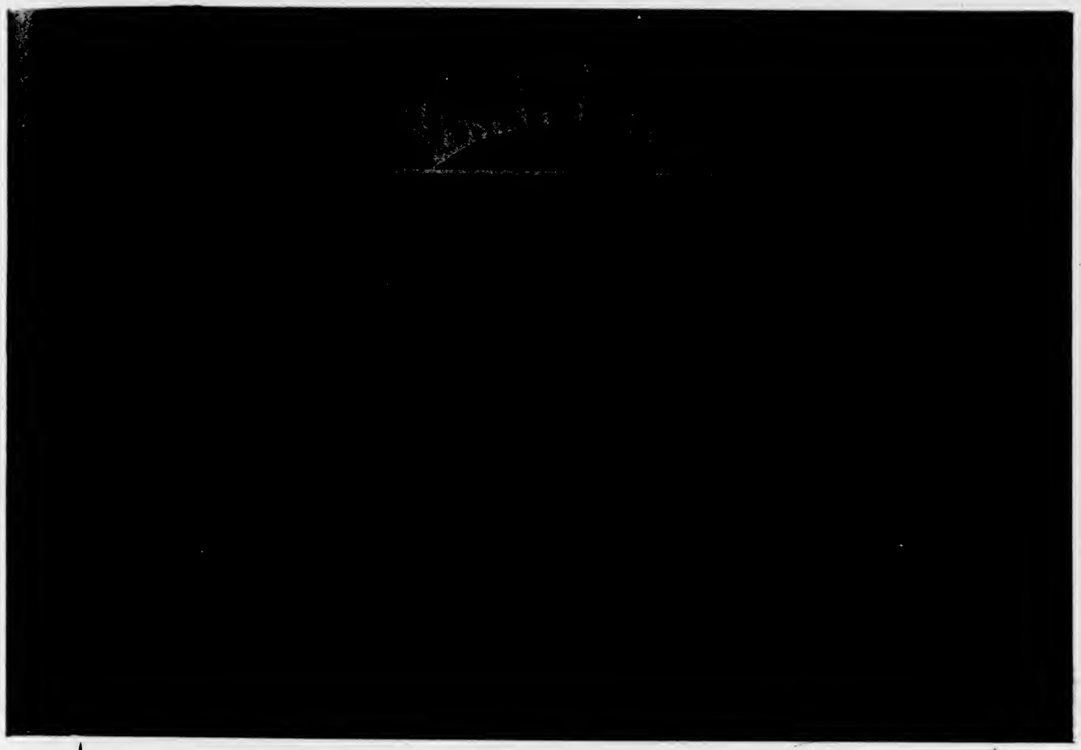
After election a general talk was indulged in, and as a result the club-rooms have been renovated and fitted up so that now they rival any in the country.

AUTOMATIC SPRINKLER DID GOOD WORK.

The automatic sprinkling system installed on the Grand Opera House stage after the Iroquois fire in Chicago prevented what might have been a bad fire in the theater early yesterday morning. Watchman McAllister was making his rounds when he heard a hissing sound, and on the stage he found water trickling from the sprinkler.

On the left side of the stage he saw a tiny tongue of flame that became larger every moment. He turned in an alarm. The firemen arrived quickly, but before the first apparatus came the fire had spread to a pile of scenery that was banked on the left side of the stage. This scenery was fireproof, but it burned.

The more fire there was the better the automatic sprinkler worked. There was a sheet of water falling from it when the firemen arrived. Two alarms were rung in, for when the first firemen got to the theater it looked serious. The sprinkling apparatus did such good work, however, that the fire did not spread off the stage, and the only thing that was really damaged was about one-third of the scenery of "The Prodigal Son." —New York Sun.

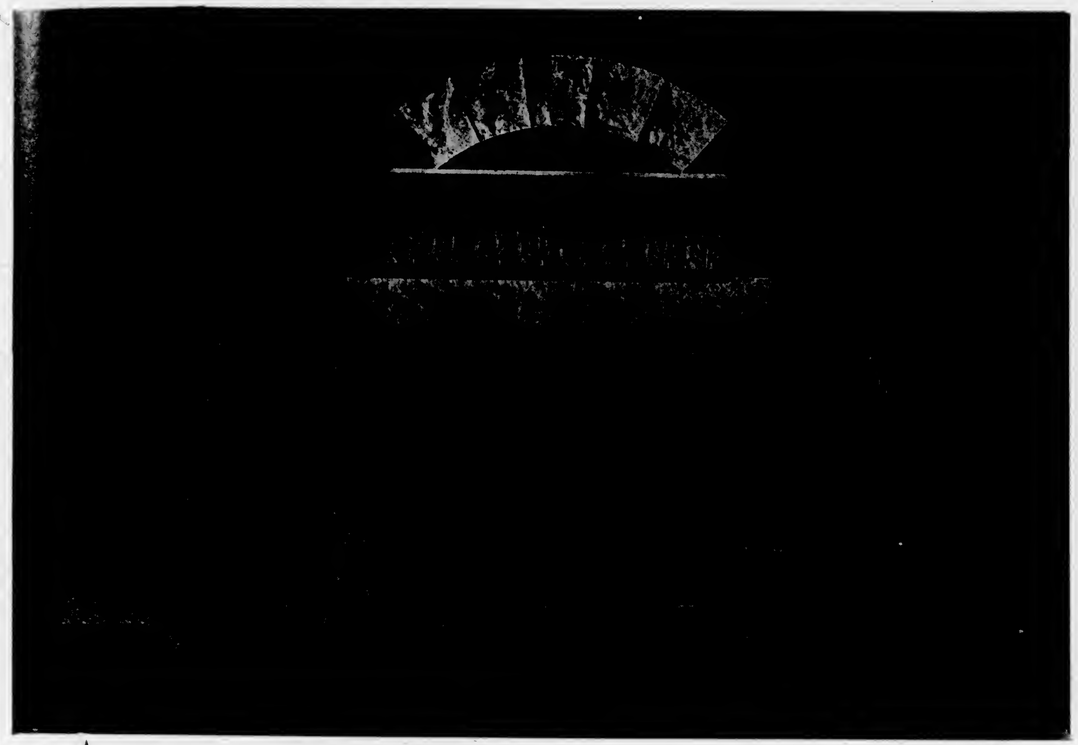


AUTOMATIC SPRINKLER DID GOOD WORK.

The automatic sprinkling system installed on the Grand Opera House stage after the Iroquois fire in Chicago prevented what might have been a bad fire in the theater early yesterday morning. Watchman McAllister was making his rounds when he heard a hissing sound; and on the stage he found water trickling from the sprinkler.

On the left side of the stage he saw a tiny tongue of flame that became larger every moment. He turned in an alarm. The firemen arrived quickly, but before the first apparatus came the fire had spread to a pile of scenery that was banked on the left side of the stage. This scenery was fireproof, but it burned.

The more fire there was the better the automatic sprinklers worked. There was a sheet of water falling from it when the firemen arrived. Two alarms were rung in, for when the first firemen got to the theater it looked serious. The sprinkling apparatus did such good work, however, that the fire did not spread off the stage, and the only thing that was really damaged was about one-third of the scenery of "The Prodigal Son." —New York Sun.



An Artist's Unique Bill.

An old church in Belgium decided to repaint its properties and employed an artist to touch up a large painting. Upon presenting his bill the committee in charge refused payment unless the details were specified, whereupon he presented the items as follows:

To correcting the Ten Commandments	$ 5.12
Embellishing Pontius Pilate and putting new ribbon on his bonnet	3.02
Putting new tail on the rooster of St. Peter and mending his comb	2.20
Repluming and gilding left wing of Guardian Angel	5.18
Washing the servant of the high priest and putting carmine on his cheeks	5.02
Renewing heaven, adjusting the stars and cleaning up the moon	7.14
Touching up purgatory and restoring lost souls	3.06
Brightening up the flames of hell, putting new tail on the devil, mending his left hoof and doing several odd jobs for the damned	7.17
Rebordering the robe of Herod and adjusting his wig	4.00
Taking the spots off the son of Tobias	10.30
Retouching Balaam's ass and putting one shoe on him	5.70
Beautifying Adam's lost rib	5.26
Putting a new stone in David's sling, enlarging the head of Goliath and extending Saul's leg	6.13
Decorating Noah's ark, putting a head on Shem and cutting Ham's hair	4.31
Mending the shirt of the prodigal son and cleaning his ear	3.39
	$77.00

INDEX TO ADVERTISERS

INDEX TO ADVERTISERS

The Architect and Engineer
Of California

Issued monthly in the interests of the Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast.

Terms of subscription, $1.00 per year.

Single Copies, Fifteen Cents.

Offices { 215 Sansome Street, San Francisco, Cal., Telephone Davis 945.
142 S. Broadway, Los Angeles, Telephone Home 5747.

Contents for March

The Architect and Engineer
Of California

Issued monthly in the interests of the Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast.

Terms of subscription, $1.00 per year.

Single Copies, Fifteen Cents.

Offices { 215 Sansome Street, San Francisco, Cal., Telephone Davis 945.
142 S. Broadway, Los Angeles, Telephone Home 5747.

Contents for March

Charles F. Whittlesey, Architect

The Architect and Engineer
Of California

VOL. IV MARCH, 1906. NO. 2

California's Largest Reinforced Concrete Building

CHAS. F. WHITTLESEY, Architect

THE Auditorium at Los Angeles has been under construction for about six months, and will be completed July 1st of this year. It occupies the site of the old Hazard's Pavilion, facing Central Park, on the corner of Fifth and Olive Streets.

The structure is of reinforced concrete from foundation to roof inclusive, and is probably, in some respects, the most remarkable building ever erected of this material.

The building measures 165 feet on Fifth street and 175 feet on Olive. The portion on Fifth Street, 165 x 65 feet, facing the park, is to be used for an office building for physicians and dentists above the third story. The central section will be nine stories high.

In the middle of the Fifth street facade is the main entrance to the Auditorium. This entrance is 42 feet wide and leads through the office building to the Auditorium, with a large lobby, ticket offices, elevators, etc.

There is a stage entrance 10 feet wide at the east end of the Fifth-street facade.

The remainder of the first story of the office building is divided into six stores.

In the basement is a cafe and banquet hall with seats for nearly 800, with commodious kitchen accommodations, below which, in the sub-basement, is an engine and machine room of generous proportions, in which will be installed a complete lighting and power plant.

On the second and third floors of the office building is a small choral hall with a balcony, having a seating capacity of 800 and a complete stage equipment. There are also on these floors a lecture hall with balcony, having a seating capacity of 1,000.

The second and third stories also contain the quarters for the Temple Baptist Church, of which Rev. Robert J. Burdette is pastor, consisting of social rooms, parlors, Sunday-school and primary school rooms, library, pastor's study, committee and trustees' rooms and a creche or nursery, where infants can be cared for while their parents attend church.

Under the steep roofs of the office building there are large rooms with high ceilings, for art studios, photographers and lodge halls.

The main auditorium, in which the chief interest centers, covers with its stage an area of 165 x 110 feet, and is the largest theatre west of Chicago. Its normal seating capacity is 3,500, with provision for seating 5,000 for special conventions, etc.

There is a broad foyer extending all around the audience room, with twelve pairs of wide doors leading out onto Olive street and connected also

Charles F. Whittlesey, Architect

The Architect and Engineer
Of California

VOL. IV MARCH, 1906. NO. 2

California's Largest Reinforced Concrete Building

CHAS. F. WHITTLESEY, Architect

THE Auditorium at Los Angeles has been under construction for about six months, and will be completed July 1st of this year. It occupies the site of the old Hazard's Pavilion, facing Central Park, on the corner of Fifth and Olive Streets.

The structure is of reinforced concrete from foundation to roof inclusive, and is probably, in some respects, the most remarkable building ever erected of this material.

The building measures 165 feet on Fifth street and 175 feet on Olive. The portion on Fifth Street, 165 x 65 feet, facing the park, is to be used for an office building for physicians and dentists above the third story. The central section will be nine stories high.

In the middle of the Fifth street facade is the main entrance to the Auditorium. This entrance is 42 feet wide and leads through the office building to the Auditorium, with a large lobby, ticket offices, elevators, etc.

There is a stage entrance 10 feet wide at the east end of the Fifth-street facade.

The remainder of the first story of the office building is divided into six stores.

In the basement is a cafe and banquet hall with seats for nearly 800, with commodious kitchen accommodations, below which, in the sub-basement, is an engine and machine room of generous proportions, in which will be installed a complete lighting and power plant.

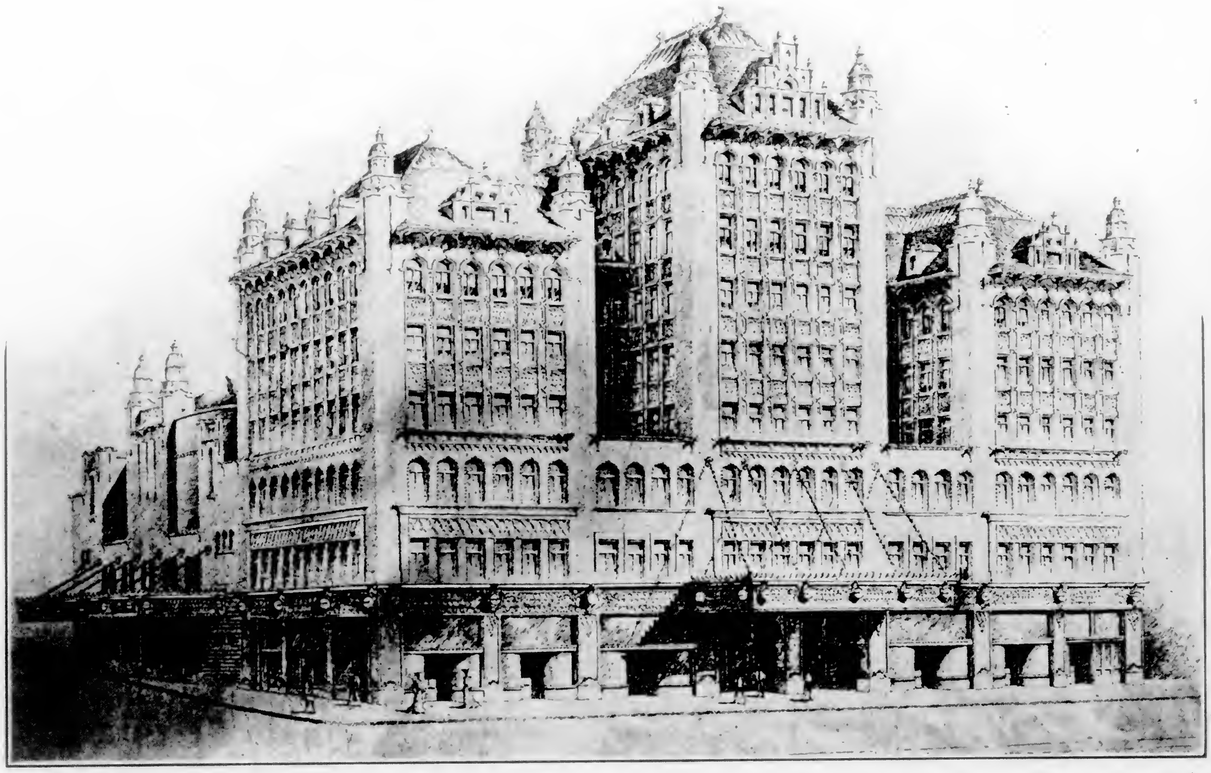
On the second and third floors of the office building is a small choral hall with a balcony, having a seating capacity of 800 and a complete stage equipment. There are also on these floors a lecture hall with balcony, having a seating capacity of 1,000.

The second and third stories also contain the quarters for the Temple Baptist Church, of which Rev. Robert J. Burdette is pastor, consisting of social rooms, parlors, Sunday-school and primary school rooms, library, pastor's study, committee and trustees' rooms and a creche or nursery, where infants can be cared for while their parents attend church.

Under the steep roofs of the office building there are large rooms with high ceilings, for art studios, photographers and lodge halls.

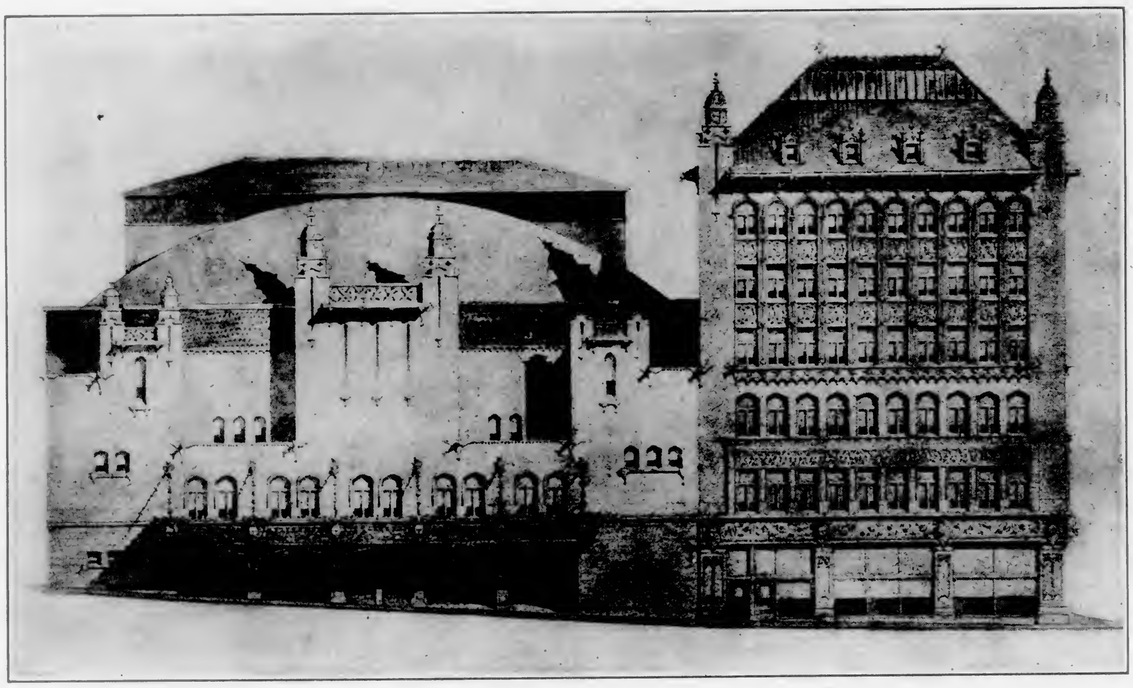
The main auditorium, in which the chief interest centers, covers with its stage an area of 165 x 110 feet, and is the largest theatre west of Chicago. Its normal seating capacity is 3,500, with provision for seating 5,000 for special conventions, etc.

There is a broad foyer extending all around the audience room, with twelve pairs of wide doors leading out onto Olive street and connected also



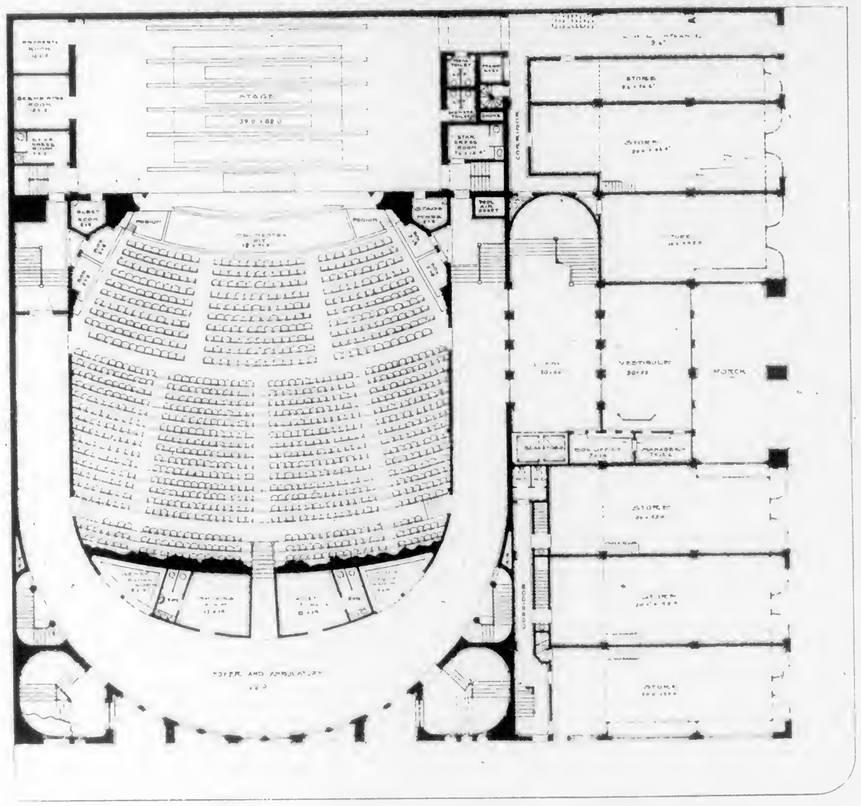
Auditorium of Reinforced Concrete, Los Angeles.
Charles F. Whittlesey, Architect

John B. Leonard, Consulting Engineer C-349



Elevation on Olive Street showing Auditorium

C-350



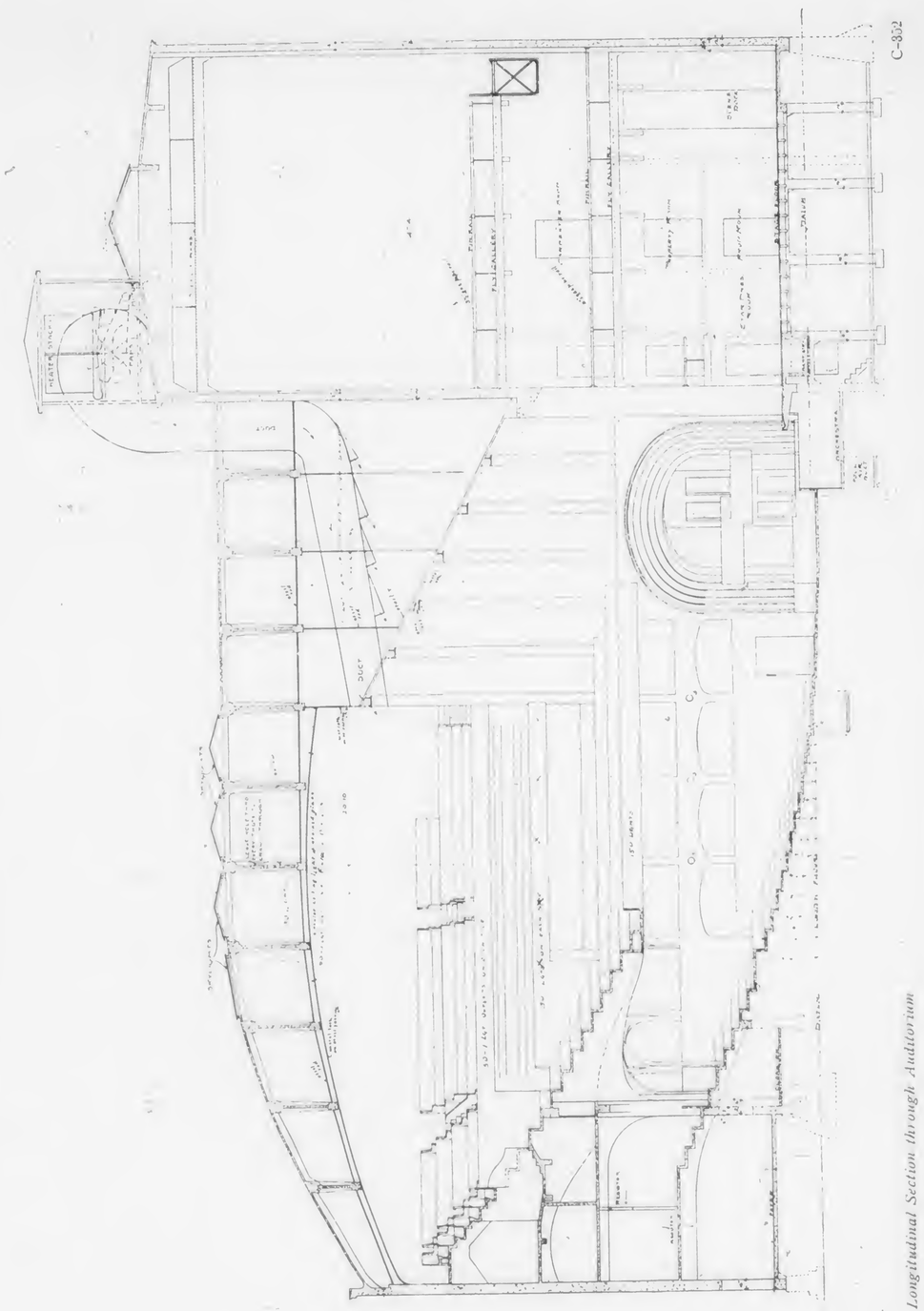
First Floor Plan, Auditorium C-351

with the main entrance lobby on Fifth street. The isacoustic curve of the seatings in the main floor of the body of the house rises at the rear to such a height that the seatings cover entirely the main foyer. There is an enormous balcony which splits up on both sides into shallow galleries in four tiers, each of which merges into the main balcony without a break in the rows of seats.

This balcony is carried on great cantilevers of reinforced concrete so that there are no columns in the floor below to obstruct the view from the seats under the balcony. The great height of this balcony admits of two stories of foyer for the balcony under the seats. These foyers are accessible to the balcony through vomitoria, such as were used in the ancient Coliseum at Rome; so that it is not necessary to climb to the rear of the balcony and then descend to the seats in the front rows.

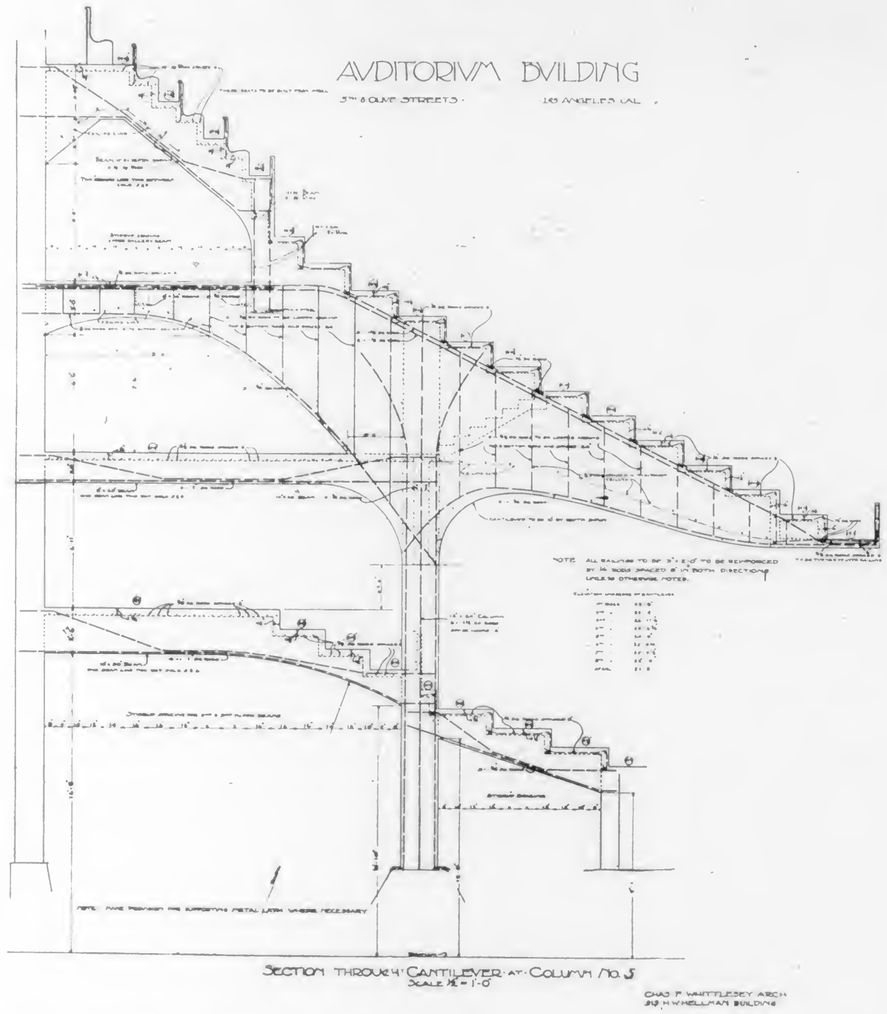
The roof over the auditorium will be entirely of reinforced concrete, carried on trusses of the same material, having a clear span of 110 feet. These trusses are ten feet apart. The vibratory strain on the roof, due to the tones from the immense organ, which will be installed over the proscenium arch, is a factor which it is necessary to consider in the calculations for strength.

The unusual size of this room and its stage makes the question of acoustics very difficult. The farthest seats are much beyond the ordinary range of the human voice, and therefore the sound waves are assisted by the air currents of the ventilating system. The air is blown in around and over



C-802

Longitudinal Section through Auditorium



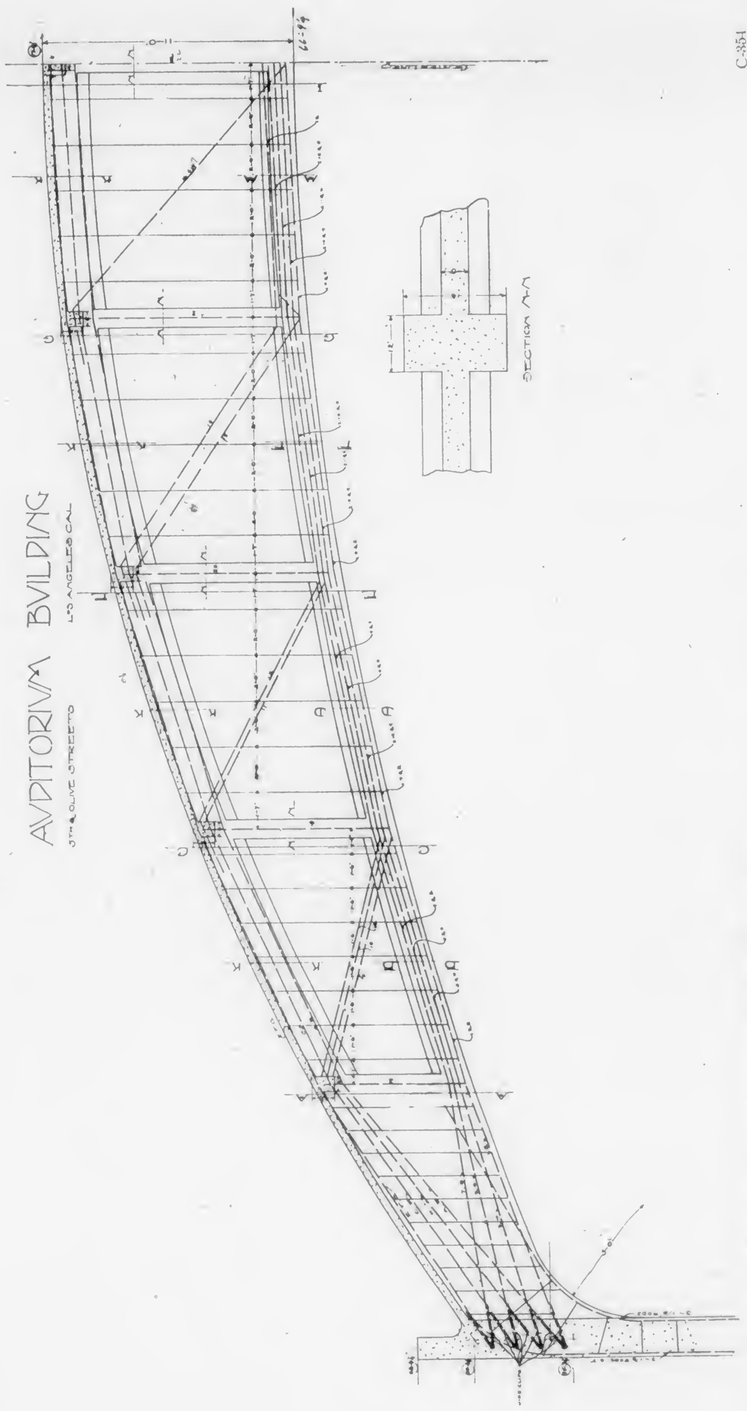
Section Through Main Balcony in Auditorium C-353

the proscenium arch and exhausted around the side and rear walls of the auditorium and through the floor.

The ventilating system is arranged to reverse in case of fire, so that the smoke will be exhausted at the ceiling and the fresh air driven in at the floor and near the exits.

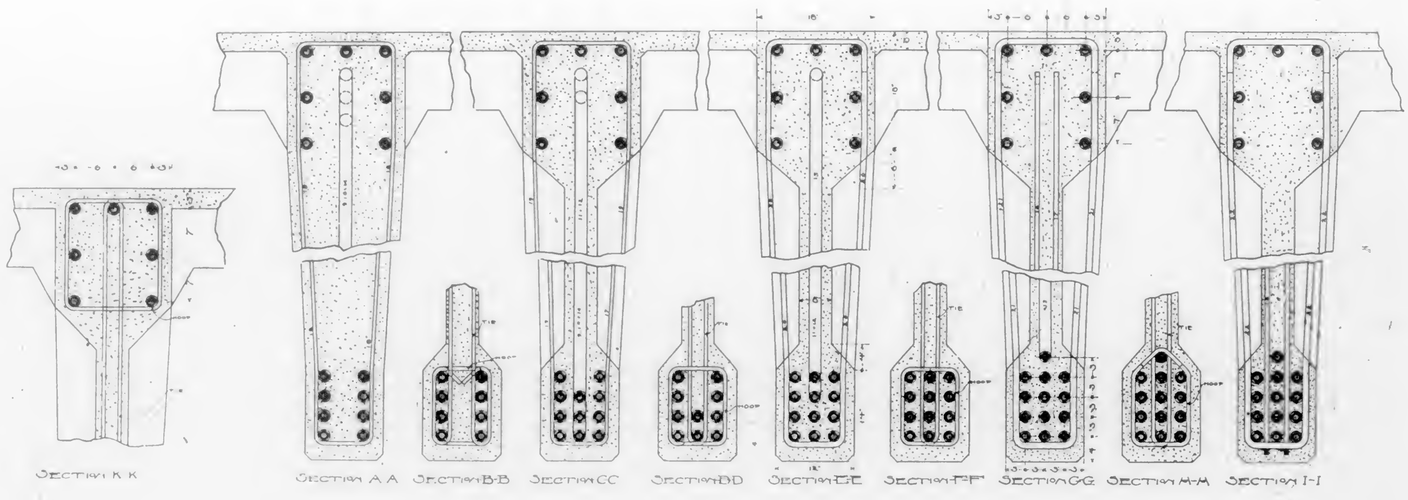
The stairways and exits are so distributed that the entire house can be emptied quickly without congestion.

The writer employed Jno. B Leonard of San Francisco as engineer, and to him were referred the problems involved in fabricating the design of the architect in reinforced concrete, in accordance with the plans submitted in the competitive sketches. Mr. J. G. Rae has been the engineer in charge of the work in the field.



C-354

Half Section of Main Roof Trusses over Auditorium, Span 110 Feet
(EDITOR'S NOTE—End connection changed to pin bearing.)



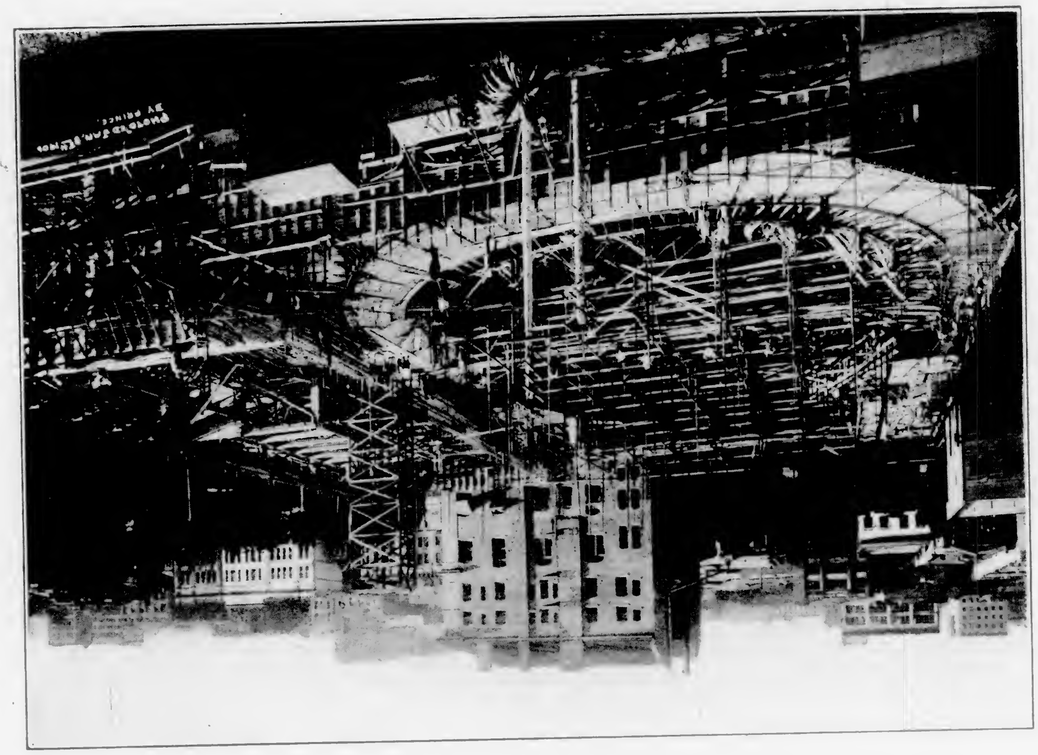
TRUSS A

Sections through Main Trusses in Auditorium Roof

C 355

Showing Construction of Auditorium in Progress

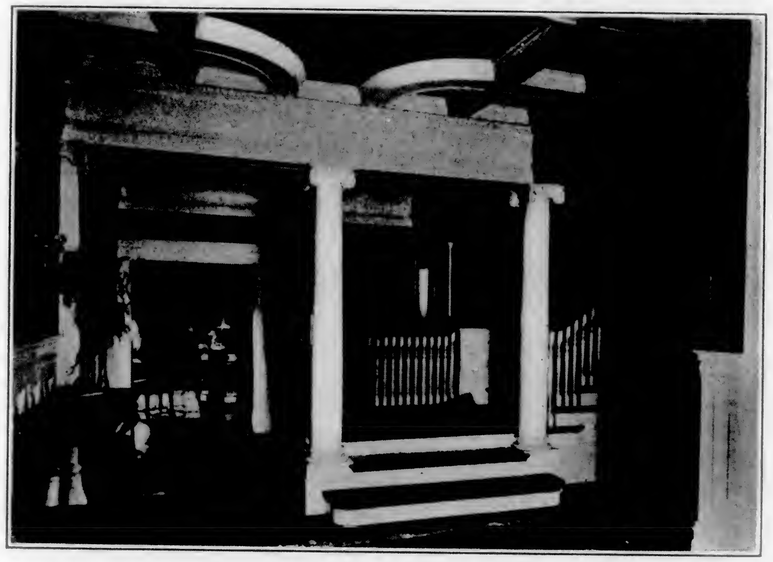
C-356



Sections through Main Trusses in Auditorium Roof C-335

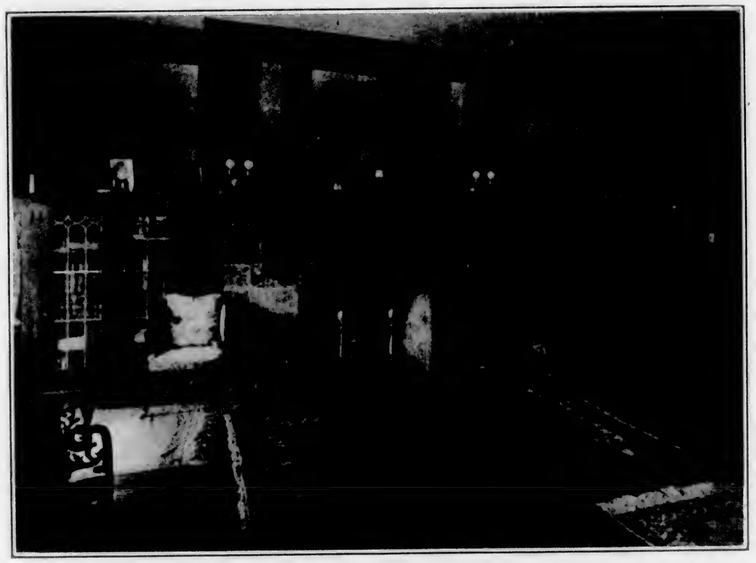
A TRUSS

Residence of Mr. Leon Kauffman, San Francisco *Edgar A. Mathews, Architect* C-357

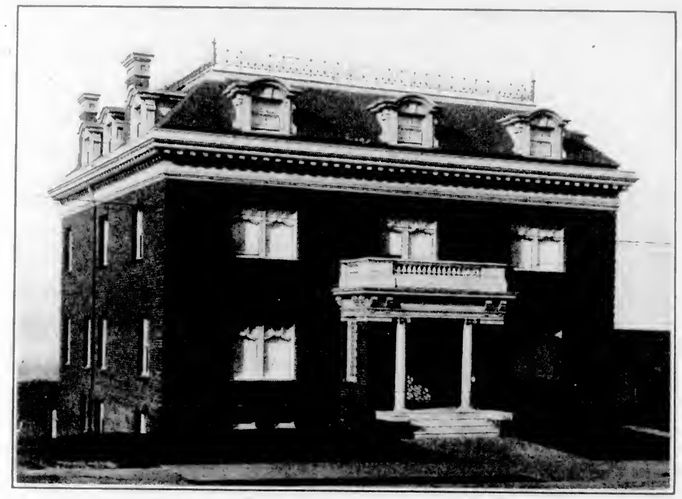


Hall in Residence of Mr. Leon Kauffman, San Francisco C-358

Dining Room in Residence of Mr. Leon Kauffman, San Francisco C-359



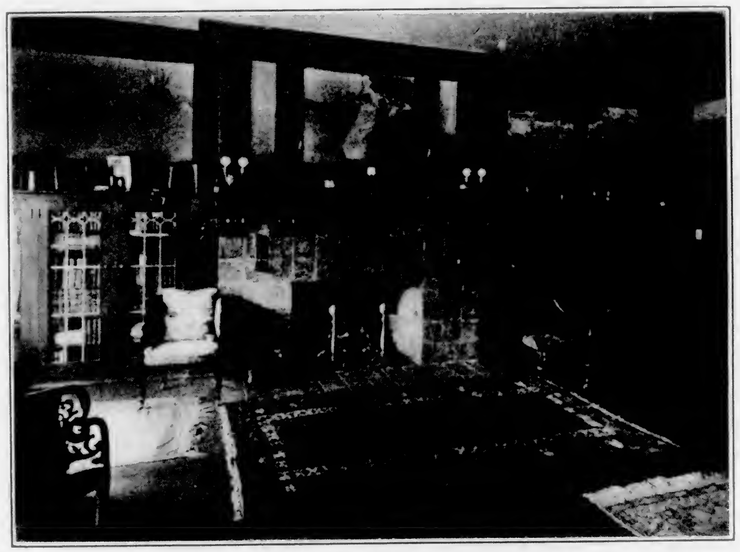
Library in Residence of Rudolph and Hugo Taussig, San Francisco C-360
Edgar A. Mathews, Architect *Panel Decorations by Mr. Arthur F. Mathews*



Residence of Mr. Leon Kauffman, San Francisco — Edgar A. Mathews, Architect C-357

Hall in Residence of Mr. Leon Kauffman, San Francisco C-358

Dining Room in Residence of Mr. Leon Kauffman, San Francisco C-359



Library in Residence of Rudolph and Hugo Taussig, San Francisco C-360
Edgar A. Mathews, Architect — Panel Decorations by Mr. Arthur F. Mathews

Steel Construction

By W. W. BREITE, C. E.

THE phenomenal increase in the erection of fire-proof buildings upon this coast, and the importance of structural steel in this form of construction requires that the processes of manufacture should be thoroughly understood and investigated so that design and specification be not accidentally or intentionally disregarded.

In dealing with this subject it is not the writer's intention to describe the multitude of ways by which designs are impaired by the slighting of details and unintelligent workmanship, but to call attention to many ways, where by the exercise of some common sense and a little precaution, the standard of manufacture in this vicinity can be greatly improved and made to compare favorably with the standards of workmanship of the large steel plants east of the Rocky Mountains.

That the development of the steel industry has been enormous within the last decade cannot be denied, but that this development has been retarded by the short-sighted policy of the manufacturers in failing to carry a sufficient variety in stock to meet the ordinary demands is a well recognized fact. As a rule the majority of the larger structures are fabricated in the East simply because of the inability to secure the proper material here. In cases where a structure of any size is to be fabricated locally (said cases being far too few) it is invariably necessary that the material must be redesigned so as to fit the odds and ends carried in stock here.

The policy of the shops here is to bid on a structure irrespective of the fact whether they have the material called for or not. If they secure the contract they then go to the architect or engineer with the statement that the material specified cannot be secured under a certain long period, thereby delaying the structure, and offer to substitute certain sizes and shapes which they have in stock. In order to carry on the work permission is almost invariably given to make such substitution, thereby securing in many cases a poor construction and incurring to the designer numerous worries and additional work. The remedy for this is simple. A time limit clause with a bonus or penalty rigidly enforced and a positive insistence upon using material as specified.

The quality of material entering into construction is another matter of grave importance. Mill tests are seldom if ever, demanded. The consequence is that much material that would not pass muster and be rejected in eastern shops, finds its way out upon this coast, to be eventually fabricated and palmed off as first-class material. The writer knows of a case of a carload of steel rejected by an eastern shop and sold out here, the quality never being questioned. Other cases of using old material, iron in place of steel, etc. Putty, lead and paint will cover a multitude of imperfections but cannot add to the strength of material.

The quality of workmanship also admits of great improvements. To a practiced eye, a glance at the various structures now in course of construction, is enough to convince whether the work has been fabricated locally or not. While it is admitted that the shops here are not as well equipped to fabricate first-class work as those centered in the great iron and steel districts, still it must be admitted that they can turn out better work than they do, but this will never be done unless they are compelled to. In a structure under the writer's personal supervision quite recently, the foreman, being taken to task for a piece of poor

work, replied: "Hell! We always did it that way, and nobody ever kicked before." That it has "always been done that way" is no reason why it always should be.

The only safeguard to insure good workmanship is by proper and conscientious shop tests and inspection, the value of which is not fully appreciated until confronted by the improved quality of workmanship secured by the same. In one case called to the writer's attention, but ten per cent of shop rivets were perfect, forty per cent were very poor and the remaining fifty per cent were absolutely worthless, still as there was no inspector on this work, nothing was said or done and the material incorporated into the structure as it was. The owner paid for a first-class job and there was no reason why he should not have received it.

Few if any of the shops make templates of their work, the usual rule being to lay out material and connections with a tape or rule and chalk line. The result of this is easily seen not alone in the shop but in the erection by the reaming, cutting and drilling necessary to make members fit.

Another evil to be remedied is the making or at least the lack of making proper shop details. Proper details should be made for all structures and these details submitted to the engineer or architects to be checked and approved, so that the design be economically and properly developed. Material injured or lost in transit can easily be exactly duplicated if proper shop details are on file. Weights can be accurately estimated therefrom and form a check on shipments. Many cases have come under the writer's notice where the strength of details was less than the strength of design and vice versa. In one case the shop had adopted a connection for each size beam irrespective of the weight of beam or carrying capacity and all beams of that certain size whether of heavy or light section, two feet or forty feet long, or carried one ton or twenty ton received the same connection. Another case in the fabrication of plate girders a standard of six-inch spacing from center to center of rivets was used throughout, and the superintendent could not be made to realize that as the shear towards the ends of the girder increased, the distance from center to center of rivets should be less and advanced the same argument that, "He had done it before that way and it never fell down." It may be true that it "never fell down," but that is no criterion that it never will and if it ever should it is not the shop who would be blamed for improperly developed details, but the engineer for poor design.

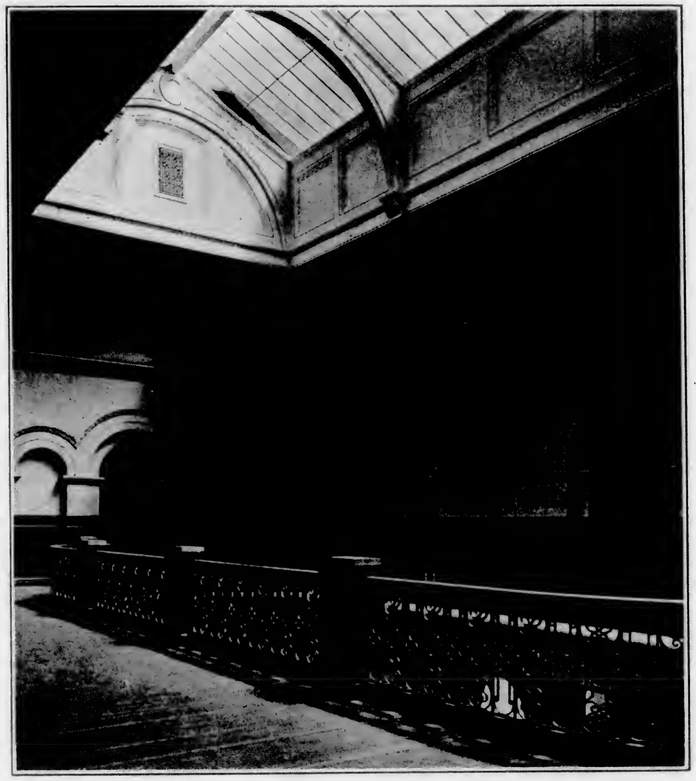
While it is true that the quantity of cast iron used is far less than steel, it is also true that the methods and manufacture of such cast iron as is used be also investigated. Little attention is paid to the making of proper patterns and very few cases of good workmanship can be met with. Specimens of cast iron fabricated years ago in this locality, far exceed the workmanship displayed by work now being manufactured. The poor quality of the metal resulting from the use of too much scrap, improper facilities for pouring causing unequal cooling and many other points of manufacture admit of great improvement. The writer has examined columns supposed to contain metal two-inches thick in the shaft, but which in reality contained three inches on one side and less than one inch on the other. Blow holes were frequent and in some instance there was but one-quarter inch of metal. What has been said about shop details of steel is also applicable to cast iron, and in fact more so. All brackets and connections should be accurately figured to sustain the loads imposed thereon and not left to be guessed at by some irresponsible shop superintendent as is often the case.

Another subject of traditional interest is painting. Many private preparations are on the market and almost any of the leading brands are good. Oil is also used to a great extent but the practice of using four parts oil to one part paint when nothing but pure paint is specified is a practice to be condemned.

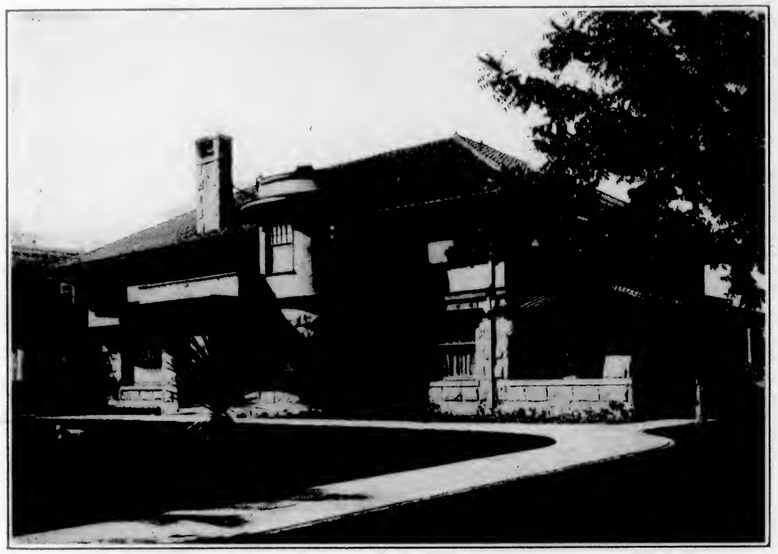
Paint should be applied to a clean, dry surface, free from rust or scale and well brushed out. Good paint improperly applied is worse than poor paint skilfully used or no paint at all.

Many of the manufacturers here contend that they cannot compete with Eastern prices. The sooner the local shops realize that the question of quality of material and workmanship is often a more important factor than the question of price, the local industry will be better patronized and the work will be fabricated here where it unquestionably should be.

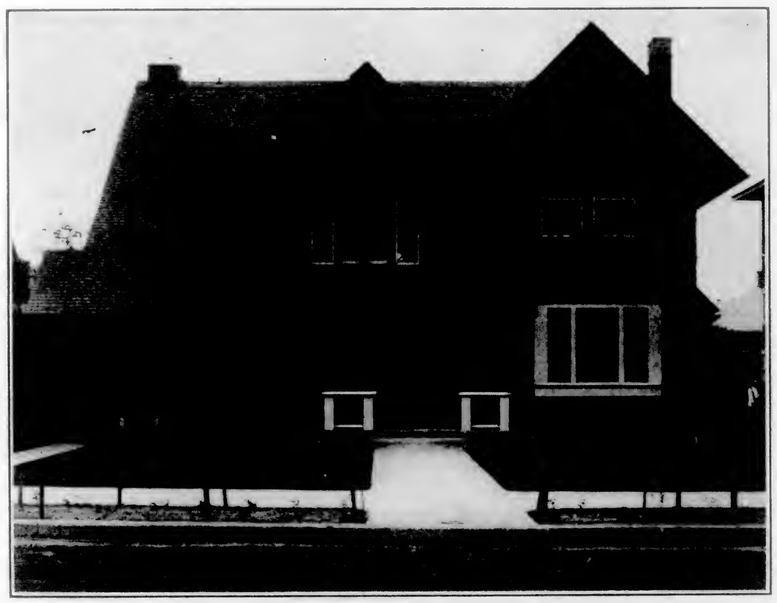
Main Floor of Exhibition Room, Natural Sciences Building, Stanford University
Henry A. Schulze, Architect C-361



Gallery Floor of Exhibition Room, Natural Sciences Building, Stanford University C-362



Residence of Mr. Lee Foster, Los Angeles *Hunt & Eager, Architects* C-363



Residence of Mr. J. B. Lippincott, Los Angeles *Hunt & Eager, Architects* C-364

Fire Proofing and Insurance*

By EDWARD T. CAIRNS

THE appointment of this Committee only three months ago was so recent that there has been no time for organized research or experiment on an extended scale, but the views of the individual members of the Committee based on their personal experience and investigation, are combined in the following report which is presented as an outline of the most important work done on the subject up to this date, and acknowledgment is made at the same time that the subject is very imperfectly covered and that the members of the Committee have much to learn regarding the fireproof qualities of cement. Indeed, there is such a scarcity of reliable data, and so little actual experience with fires in buildings of any form of concrete construction, that, at the present time, any discussion of the subject must of necessity be largely on a theoretical basis, or, at the best, on the basis of laboratory experiment, both of which, while valuable and necessary, must be supported by actual field experience before the subject can be regarded as properly covered.

In considering the so-called fireproof qualities of cement or concrete it will be well to fix in our minds at the outset the proper definition of the word "Fireproof." In a technical sense there is of course no such thing as a strictly fireproof building, that is, a building which is absolutely proof against damage by fire; there are, however, many materials which are non-inflammable and capable of resisting or retarding a fire of ordinary intensity for a sufficient length of time to allow the extinguishment of the fire with nominal damage to the structure. Therefore a building properly constructed of such materials may be entitled to the nominal term fireproof though, as a matter of fact, the strictly correct term would be fire resistive. Whether it is practical at this late day to make any such grammatical distinction of terms is doubtful, so that perhaps it will be as well for us to recognize the old term "Fireproof," notwithstanding its faults and the fact that in the past it has been the occasion of some misunderstanding and the cause of an over confidence which has cost many a building owner dearly.

By cement in fireproof construction of course we mean generally, the Portland cement which forms the vital element in monolithic concrete either plain or reinforced, or concrete block construction, and since cement is always used in connection with the other materials making up concrete of some sort, we may as well use the term Concrete Construction in place of Cement Construction.

That good concrete is a fireproof material in the above defined sense is a well established fact, as has been demonstrated in a limited way by tests in laboratory and field. Most of the laboratory trials have been made with small buildings ten to fifteen feet square, heated to 1700 or 1800 degrees with wood or gas fires for two to three hours' time—a test which, while not calculated to demonstrate the ultimate fire resistance, is thought to approximate the ordinarily severe fire which may be expected in most kinds of buildings; good concrete has successfully passed these tests and the occasional failure of poor material under the same trial has taught some valuable lessons.

The field experience is more difficult to summarize. The first case in mind is generally the great Baltimore fire in which were several small build-

*Report of Special Committee read at Cement Workers Convention Milwaukee.

ings involving more or less concrete construction, all of which came through the fire very well, though the conditions were somewhat favorable in that the fire in each individual building was of short duration and no water was played on the building while hot. The Iroquois Theatre fire in Chicago was another case of a concrete building suffering very little damage, but in this case also the fire was of very short duration and the test therefore very mild. The Pacific Coast Borax Co. in Bayonne, N. J., suffered a severe fire about four years ago in a building all of concrete except the wooden roof. In this case the test was very severe in the upper part of the structure, and the damage to the concrete very trifling, a good test with remarkably good results. Other fires of less prominence have occurred with similar results.

Considering first reinforced concrete: In order to be fireproof in the accepted sense the concrete itself must possess two important qualities, viz.: 1st. it must be capable of withstanding such disintegration or breaking as would either diminish its own strength or expose to fire the steel reinforcement; and, 2d, it must effectually insulate the imbedded steel reinforcement from the heat of a fire even when not broken down.

There are several factors affecting the first of these requirements; the stone or other aggregate must not lose its strength, or break or fly in pieces readily. In this particular there is doubtless some difference between the various aggregates commonly used, though we have only a limited amount of data bearing on this point. The National Fire Protection Association's Committee on Cement for Building Construction conducted a series of experiments a few months ago which afforded a comparison between Limestone, Gravel which contained a considerable proportion of lime, Granite and Cinders. These tests showed practically no breaking or spalling of the concrete, but the conditions were favorable to such result in that the samples were rather small and were so arranged in the test furnace that throughout the tests they were free to expand in all directions and the individual stones of the aggregates were of small size, not larger than ¾″. Analysis of numerous tests by the New York Building Dept., the British Fire Prevention Bureau, and other sources, also fails to reveal any decisive difference in fire resistance of various concretes due to difference in the kind of aggregates in common use. The latest test of this which has come to our notice was made last October by the British Fire Prevention Bureau, which included simultaneous trial of seven small slabs of 1-2-3, concrete of different aggregates described as Slag, Broken Brick, Coke Breeze, Furnace Clinker, Granite, Burnt Ballast and Thames Ballast, the relative efficiency from high to low being about in the order named. Two of these, Furnace Clinker and Thames Ballast, were quite deficient, but the others did not differ widely and the result was similar to that obtained in many other tests, that is, some small cracks developed and in some cases the material was washed off by hose streams to a depth of an inch or so, but none of the slabs broke down. It is the opinion of many that Granite or any stone containing a relatively large percentage of water crystals is most objectionable as it has a tendency to burst as the crystals are decomposed, this danger being obviously greatest where the individual stones are of a large size and the use of such stone in concrete is therefore objectionable.

Limestone has been criticized as an aggregate on the ground that it is calcined or reduced to powder quickly under high temperature. It is true that it does lose its strength in this way more easily than most other stones, but this Committee are of the opinion that the stone does not so weaken much, if any, before the cement which binds the units together, so its weakness is not really such an important matter as might at first appear. It is probable that trap rock, a hard dense stone found in some Eastern States,

or silicious gravel, or strictly clean clinker, make the most desirable aggregate from the fireproof view point, though the latter being practically unobtainable in sufficient quantities, makes a recommendation for its general use unwise.

The kind of sand, or its state of purity or sharpness, is thought to affect the fireproof qualities of concrete only as it affects the normal strength of the material and therefore the factor of safety upon which the endurance of the structure under fire largely depends.

It is very evident of course that the integrity of concrete under exposure to fire, as well as under normal conditions, depends primarily on the cement which binds the mass together and in this fact lies the most important inherent weakness of concrete as a fireproof material. As to the fireproof qualities of Portland Cement itself, very little data appears to be available. The Standard Specifications adopted by the Am. So. for testing materials, the Am. So. of Civil Eng. and others, does not touch on the point at all, possibly for the reason that some have assumed that cement which meets the other requirements as to strength, soundness, etc., cannot vary much in fire resistance, and perhaps for the reason that a very large part of the cement for which these specifications are prepared, is used in bridges, embankments, marine work, etc., where fire resistance is not a factor. Neither do the U. S. Army Engineers, nor various foreign specifications cover the point, probably for the same reasons. Cements which conform to the standards above referred to cannot vary much in the proportion of their chief constituents, though some of the minor elements do vary considerably, and it is well known that there is quite a wide difference between various brands as to the quantity of water required for hydration and it may be these differences, especially the latter, may have an important bearing on the fire resistance. Various experiments now under way will doubtless settle the question within the next year or two, but for the present we must assume that all Portland Cements conforming to the accepted standards in other respects are of equal fire resistance.

The statement so often made that cement is necessarily fireproof because in the course of its manufacture it has been burned in a kiln hotter than any burning building is not true any more than is the same statement concerning hollow tile or other materials. They both appear in a building under radically different conditions than obtain in any sort of a kiln, the important difference in the case of the cement being that when mixed into a concrete it is combined in a crystalline form with water which is a material very easily affected by heat. There is no occasion for discussing here the intricate question of the chemistry of cement. It is sufficient to say that the effect of heat is to dehydrate it or separate the water from the cement and thus reduce it to a condition resembling its original powdered state. The temperature at which this dehydration occurs is probably about 1000° F.—that is, the cement itself must reach that temperature, but concrete being a slow conductor of heat, any considerable mass of the material cannot absorb that amount of heat for some time after the temperature at its surface has reached the 1000° or even a very much higher point; hence it is that in a burning building a temperature of 1000 to 2000 degrees may be applied suddenly to the surface of a concrete wall or floor and the result will be an immediate dehydration of only a very thin film of cement at the surface and a very slow progression of dehydration into the interior of the mass. As above stated, this dehydrated or re-calcined material does not necessary fall away unless struck by a stream of water or other object, or unless the rupture of individual stones in the concrete throws it off, and so long as it remains in place it acts as a very efficient insulator for the remaining good concrete

beneath, so that the penetration of heat into the mass and its consequent dehydration grows slower and slower. If by this process the cement loses its adhesive strength, of course the concrete is ruined, and in the case of walls or columns, its crushing strength is reduced in the proportion that the dehydration of the cement has penetrated from the surface, and this is irrespective of the kind of aggregate used. The logical conclusion of the above is that, given a cement and aggregate of good quality, the fire resistance of a concrete wall or floor is entirely a question of the time of exposure and temperature of the fire.

Whatever the comparative value of various aggregates or cements may be, a far more important factor in the strength of concrete under fire as well as under normal conditions, is the relative proportion of the materials and the method of combining them. The necessity of a dense, fairly rich concrete, practically free of voids such as is produced by a wet mixture well tamped, is well known to all experienced users of the material, and the troubles occasioned by mixtures containing too little cement, or made too dry, or not properly tamped, are perhaps too familiar to some of us. This feature has a direct bearing on the fire resistance of the structure, as a dense, rich mixture is much less liable to spalling and disintegration than a poor, porous concrete; and if the theory is correct that the dehydration of the cement itself or the driving off of its water is what weakens the mass, then the richer in cement the mixture is, and consequently the more water is contained in the mass, the longer the cement will last because a longer time will be required to drive off the large amount of water. Furthermore, its factor of safety above the strength required for normal conditions is naturally much greater and that has a most important bearing on the fire resistance feature; a structure so built that a considerable proportion of its ultimate strength may be destroyed by fire without causing a collapse, obviously has a much greater chance of escaping total loss than one which, though non-inflamable, has no great strength above that required for normal conditions, and so would be subject to collapse on the failure of some one or two of its vital members. The abnormal strains to which a building is subject during a fire are always severe and often not to be determined in advance; the falling of heavy weights and internal stresses set up by rapid changes of temperature are severe trials to any building and the structure that contains the greatest reserve strength above that required for ordinary demands is the safest. This of course refers to any type of construction as well as to concrete, and the disregard of this principle has in many cases cost dearly in case of fire. In the famous Baltimore conflagration the great weakness of tile and steel construction was along this very line; the tile was good enough for its normal uses but was generally too thin and frail and too poorly secured in place to withstand the mechanical strains imposed by a severe fire.

As to the second general requirement of insulating quality of concrete for the steel reinforcement, the importance of this function of the material is apparent when we remember that in practically all reinforced concrete construction the steel, of whatever style or system, is designed for the vital duty of carrying all the tensile strains of the structure and in order to do this it must be placed as low as possible in the beam or slab; in fact, there is no reason, structurally, for more than barely covering the rods. It is well known that steel loses its strength very rapidly on exposure to fire, and steel of any form used as a reinforcement for concrete, is no exception to the rule. According to "Kent" the tensile strength of steel at 670 degrees is only 75% of its ultimate strength under normal temperature; at 725 degrees, 60% at 770 degrees, 50%; at 860 degrees, 40%; at 1025 degrees, 30%; from which it is obvious that the reinforcement of a concrete floor beam, slab, column or

wall must have some very efficient insulating material between it and an ordinary fire if its strength is to be retained. It is well known that concrete is a very slow conductor of heat but there is only a little exact data on the subject. The tests of the National Fire Protection Association Committee above referred to were chiefly for the purpose of determining that point and showed that on an average of eleven sample rods embedded to a depth of one inch in concrete reached a temperature of 670 degrees where their strength is reduced 25 % in 59 minutes under average temperature of about 1500 degrees at the surface of the samples.

This would appear to afford ample proof that one inch of concrete covering over steel reinforcement, or about steel I-beams, is not sufficient for reliable fire protection. In many large buildings, particularly of mercantile or storage occupancy, temperatures of 1800 to 2000 degrees may prevail in portions of the structure for much more than an hour, in which case 2 inches or more of protection would be necessary to preserve sufficient strength in the steel to carry its load. This would be true even if all the concrete were certain to remain in place during a fire and with the possibility of some of the material breaking off the extra thickness is doubly necessary. As to the relative value of the various kinds of aggregate as an insulator, none of the numerous tests referred to indicate a very wide difference, but such variation as does appear is in favor of the cinder aggregate and most unfavorable to the granite. Here again the superiority of a rich, dense concrete appears, as the tests indicate that as between rich, medium and lean mixtures the richer mixtures were appreciably slower conductors of heat than the lean ones.

The fire resistance of concrete blocks for wall construction has been the subject of much anxious inquiry for some months past. The question is being investigated by several interests but probably most exhaustively at the Structural Materials Testing Laboratory of St. Louis by your President, Mr. Richard L. Humphrey, under the auspices of a general Advisory Board composed of representatives of a large number of engineering bodies, including this Association, and government officials. The result of this and other investigations of course cannot be foretold by this Committee, and the actual field experience with this construction thus far is too limited to afford a basis for positive conclusions. However, we are confident that most of the foregoing statements on the subject of concrete in general are applicable to small blocks of the same materials. The form in which most of these small blocks are made, involves a certain weakness under severe temperature which, while by no means fatal to the fire resistance, places a limitation on that quality which must be recognized, viz: It is subject to breakage by unequal expansion under heat, the same as is hollow tile or any other similar hollow material. Hollow blocks of concrete or tile as set in the walls or floors of a building usually present only one surface to the direct attack of fire and the consequence is that that side or face of the block expands readily and irresistibly under the influence of the heat while the other three sides receiving much less heat do not expand nearly as rapidly, with the result that the hottest side breaks away from the others. This has been demonstrated in actual fires and experimental tests for both concrete and tile. Failure from this cause would naturally occur soonest in blocks having a thin shell, inasmuch as the thinner the shell of the block toward the fire, the more quickly it will heat through and consequently expand. Therefore, if you would have a block stand a hot fire, make the webs thick.

This breaking by unequal expansion has sometimes been referred to as a bursting due to pressure of steam or gases generated in the large hollow space or cell of the block, but a very brief analysis of the conditions will

easily disprove any such statement. In the first place, there is generally no means of getting water into the interior of a block and no probability of gases from other sources being introduced therein, but if it were possible to get gas or steam into the interior space these cells are so continuous in a wall or floor and have so many vents to the atmosphere at the top of the wall or through mortar joints that the accumulation of the number of pounds pressure (estimated at 25 to 50 lbs.) necessary to burst an ordinary small block would be an impossibility under working conditions. In connection with blocks, we may repeat that as in the case of monolithic concrete, good materials, plenty of cement, careful curing, and above all intelligent workmanship, produce the most fireproof result.

To sum up this matter of the fire resistance of concrete, we may repeat that, while like all other building materials it has its limitations, it occupies and will continue to occupy an increasingly important position in the field of Fire Resistive Construction, and when intelligently used under proper conditions, may be relied on to resist such fires as any ordinary building may be expected to experience. Such intelligent use will involve the selection of good materials, will provide for the correct and uniform proportioning of them, the thorough mixing by good machinery, adequate thickness of insulation of steel, guarding against freezing, and in the case of blocks, proper curing and thickness of shell; in short, all the requisites of a building safe and strong under normal conditions with a liberal factor of safety. It may be safely assumed that concrete which is the richest, strongest and most durable under normal conditions will develop the highest fire resistance.

The relation of fire insurance to concrete construction is important to insurance companies and builders alike. The attitude of the companies toward concrete up to this time has been, like that of other interests, necessarily, one of inquiry and investigation largely. They have felt that this type of construction was in an experimental stage, acknowledged as peculiarly subject to abuse by incompetent users, and have naturally been somewhat cautious in indorsing it as fully as its advocates would like. They are now recognizing, however, that the matter is rapidly approaching a settled and known basis in the building world and they are at the present time according it more recognition in their underwriting than ever before. Insurance companies are the most earnest advocates of improved construction and are constantly urging the adoption of the best known methods and materials for building. They are investigating the whole concrete subject through the National Fire Protection Association and other channels and there need be no doubt that concrete construction will be given full credit in fire insurance rates and classifications for all its good qualities as soon as its record is established. In the meantime they are giving very liberal credit to so-called fireproof buildings of concrete construction, pratically the same as are allowed for other types as a rule. They are not, however, recognizing concrete blocks as the equivalent of good brick for the reason that such experience as they have had in laboratory and field does not warrant it. This is no doubt due partly, if not chiefly, to the fact familiar to us all, that a large proportion of the blocks made up to this time, have been of an inferior grade made without due regard to the known requirements of a good product; and in the matter of insurance rates as in other respects, good material has been made to suffer for the failings of the too large proportion of poor.

In closing, we cannot too strongly emphasize the fact that the position concrete is to occupy in the art of fireproof construction will depend very largely on the degree of intelligence and honesty of its users. It has had something of a fight to attain its present position. It is not a new proposition. For years it has been known and for as many years has been criticised as

being peculiarly subject to abuse by incompetent contractors, a criticism which we must admit is altogether too well founded, and for which some of its most ardent advocates are partly responsible. There will always be more or less such criticism, but it can be largely overcome and the art maintained on a sound basis by the intelligent and persistent following of sound engineering principles and good workmanship on the part of its advocates.

The time has not yet arrived for adopting a detailed standard for fireproof concrete construction, but we would commend to you a few fundamental principles which were laid down by the National Fire Protection Association in their last report as essential to the best results, viz:

1st. The work should invariably be designed and its entire erection supervised personally by engineers of skill and experience in this particular line.

2d. Concrete for fireproof construction should be composed of high grade tested Portland Cement, clean sand, and broken stone, gravel, slag or cinders, so proportioned that the cement will completely fill all the voids in the sand, and the mortar thus formed will a little more than fill the void in the aggregate.

3d. The materials should be well mixed by machine with enough water to make a distinctly "wet mixture" and should be tamped down so that no voids are left.

4th. All steel members of whatever style should be imbedded at least two inches in the concrete and in the case of important load carrying members, three inches.

5th. No cement work of any kind should be laid in cold weather without being safely guarded against freezing.

* * *

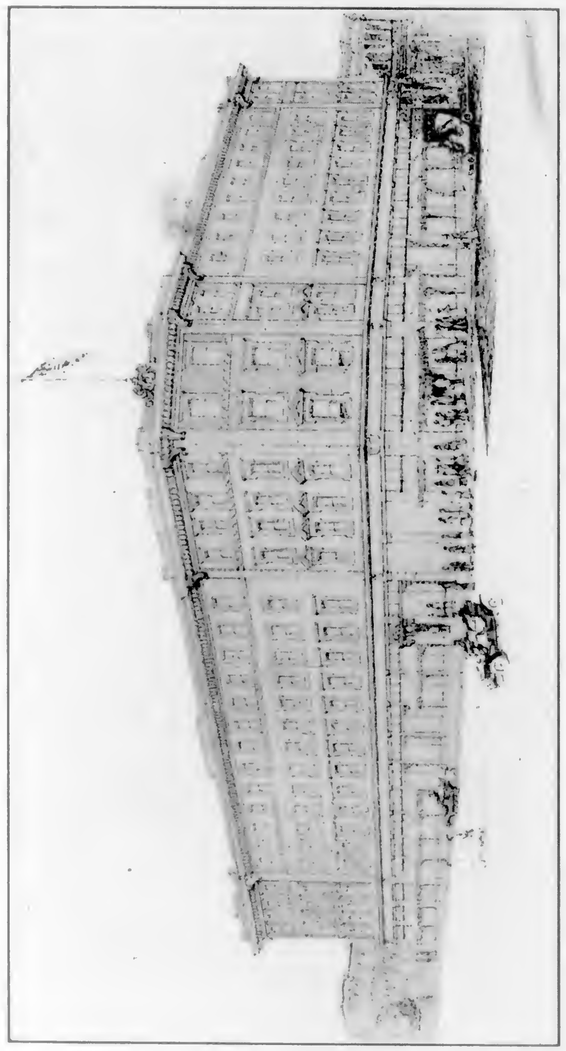
Arts and Crafts of Los Angeles

This society is giving its first annual exhibition in co-operation with the Ebell Club in the very attractive building recently erected by the Ebell Club on S. Figueroa street, Los Angeles. The exhibition will be open on the 28th, 29th, 30th, and 31st of March. Collections of work belonging to the Colonial-Spanish and Indian periods will occupy three of the large club rooms on the second floor, while the whole of the first floor reception hall and rooms will be devoted to Oriental work. The auditorium will be reserved for the "Arts and Crafts," who will assemble a fine exhibition of the handicrafts, not only from its members of the society, but also from San Francisco, Santa Barbara, and San Diego. There will be examples of work from New York and some loans. Communication is invited and may be addressed to the secretary, W. Carl Greenfield, 1608 S. Main street, or to the president, R. Mackay Fripp, Mercantile place, Los Angeles.

* * *

Servant (delivering message)—Mr. Triplett sends his compliments to Mr. Gazzam, with the request that he shoot his dog, which is a nuisance in the neighborhood.

Gazzam—Give Mr. Gazzam's compliments to Mr. Triplett, and ask him to kindly poison his daughter or burn up her piano.



Panhandle Building, San Francisco Henry H. Meyers and Clarence R. Ward, Architects C-365

Building and Designing the "Skyscraper"*

By EDWARD S. MAMMATT, Architect.

THE materials of construction of high office buildings may be classed under three heads—namely, masonry construction, skeleton steel construction and reinforced concrete construction. The first of these methods, masonry construction, depending on solid walls, is practicable to a certain limit only. As has been mentioned before, the limit is usually about ten to twelve stories in height, for the reason that beyond that height too much valuable space is necessarily sacrificed to walls. According to a table prepared by Mr. F. E. Kidder, the city ordinance requirements for a 12-story building in New York is 40 inches thickness for the first story exterior wall. The building law of Boston requires 36 inches for the same wall; St. Louis, 34 inches; Denver, 30 inches; while Chicago is satisfied with 28. Truly, a great variation in the factor-of-safety.

On the basis of the New York requirements, a building 300 feet high would require a wall 7 feet thick, which practically puts a limit to masonry-constructed walls for skyscrapers on a 25-foot lot. So we may dismiss this method of construction from the skyscraper problem.

The first advance from masonry construction was the use of cast-iron columns, which were protected with fireproof coverings. But since the possibilities of steel construction became known very little use has been made of cast iron for columns. One reason for its disuse is the difficulty of making satisfactory tests of its strength, owing to the possibility of the shifting of the core in casting. My own experience leads me to be cautious in the use of cast-iron columns. In one instance the usual tests were made for thickness of shell, no defects were apparent, but later the same column fell off a wagon and broke in two, showing a bad flaw, thus saving my reputation.

When steel columns were first used in high buildings they were merely to support the floor loads, as in the World Building in New York. This building is 199 feet to the roof line, with self-sustaining brick walls, faced with sandstone and terra-cotta, the thickness of the wall being 11 feet 4 inches at the bottom and 2 feet at the top. The steel columns were let into chases in the wall in the lower stories and set free above. The next step in high building construction was the skeleton steel frame, in which all floor and wall loads are transmitted directly to the columns and by them to the foundations. The girders of each floor are calculated to carry the floor load and exterior curtain-wall for that story, thus eliminating the necessity of exterior wall except for protection from the weather. The thickness of these walls varies in accordance with the ordinance of different cities, and in all cases the walls are thicker than is necessary.

The Chicago building-law requires that the curtain-wall of a building 250 feet high shall be 12 inches thick for the first 150 feet from the top, 16 inches for the next 50 feet and 20 inches for the lower 50 feet. Mr. W. H. Birkmire, the well-known authority on steel construction, recommends lighter curtain-walls as being safe and reducing expense.

Time is saved by adopting skeleton steel construction for this class of buildings on account of the rapidity with which they can be erected. The Central Bank Building in New York, 75 by 150 feet, fifteen stories high and two below the sidewalk, was entirely completed in seven months.

The most essential part of the construction of a skeleton steel frame is

*Extract from a paper read before the Contemporary Club, of Davenport, Ia.

the actual support of column. Other parts of the structure may be weak without causing more than local damage, but when a column fails the entire structure is liable to fall, and hence the greatest care of architect and engineer must be used in calculating stresses and framing columns and their connections.

There are various shapes of built-up columns, each with some particular feature, all suitable for this class of construction and used at will by the architect, the design depending largely on the time limit under which manufacturers will agree to fill orders. Whatever structural shape is used, whether for columns, girders, floor beams, trusses or braces, actual tests have proved that the burning of the ordinary contents of a room will heat unprotected steel to a degree that will entail disastrous results when a stream of water is thrown on the heated metal. This fact renders it absolutely necessary to encase steel in non-combustible material.

When we speak of a fireproof building we use the term relatively, since the expense of an absolutely fireproof building is too great to admit of general use. Buildings constructed so as to secure a salvage of 60 to 80 per cent. are considered fireproof. It is not necessary to discuss the various fireproof materials, for the Baltimore fire proved cement is the best fire-resisting material.

While concrete has been used in building for centuries, and steel framed structures have become common, a new method of construction has come into use by the combination of these two materials, steel and concrete, in what is known as armored or reinformed concrete. The earliest record of reinforced concrete mentioned by Mr. Kidder is the invention of P. A. J. Monier, a gardener of Paris, in 1867. In 1869 Francois Coignet, of Paris, secured a patent on a combination of iron and concrete. In 1875 W. S. Ward constructed a building near Portchester, N. Y., in which not only all the exterior and interior walls, cornices and towers were constructed of concrete, but all of the beams and roofs were exclusively made of concrete reinforced by light iron beams and rods.

European engineers have done more with reinforced concrete than American engineers, for the reason that our steel plants have produced structural steel of such excellence, the use of concrete has been neglected until within the last few years. While reinforced concrete has been used for some years for bridges and other engineering work, the first skyscraper to be built of this material was the Ingalls building, of Cincinnati, Ohio, begun in the fall of 1902 and designed by Elzner & Anderson, Architects.

From experiments with concrete and steel made by M. Considere, Capt. John S. Sewell, U. S. Engineer Corps, and others, and the exhaustive tests at Watertown Arsenal, we learn many interesting facts. One of the latest investigators, Mr. J. W. Schaub, makes the statement that if a rusty bar of iron is inserted in concrete mortar for fifteeen to twenty days it will be found free from rust, due to the iron giving up its oxygen to the cement. He adds: "The cement being anhydrous and alkaline in its reaction, will prevent the formation of rust, so that a coating of cement mortar should be, from a chemical and physical standpoint, an absolute protection against rust."

While engineers are making these and other tests with many different assumptions and empirical formula, we are impressed with the lack of uniformity in the factor-of-safety. We are impressed with this lack in all structural designing. In ordinary construction, such as we have to deal with in a city of this size, it is the writer's custom to take the average given by available authorities. This should not be necessary and could be avoided if all tests of strength of materials were made and formulated under government inspection. It has been shown that steel reinforcement prevents shrinkage

of the concrete and greatly adds to its tensile and compressive strength. Further advantages of reinforced concrete are its cheapness of construction in comparison with structural steel and its fireproof quality. This last characteristic was thoroughly tested in the late Baltimore fire. After the fire, interest centered in a small four-story brick building, with a cast-iron front, the interior of which had been remodeled shortly before the fire, the exterior walls had been retained while the new columns, girders and floors had been constructed of concrete steel. The exterior walls were found demolished, but the interior walls were intact, except where injured by falling walls, proving beyond doubt the fireproof qualities of concrete construction. Another advantage of concrete is that ornaments and other details can be moulded of it.

There are many systems of reinforced concrete, the variation being due to the different forms of steel reinforcement. That in the Ingalls Building, mentioned above, is of cold-twisted square bars, used throughout. This system greatly increases the tensile strength of the bars after twisting and increases the mechanical grip of the bar on the concrete. The Ingalls Building is 50 by 100 feet on the plan, sixteen stories high, 210 feet above and 20 feet below the sidewalk to bottom of foundations. The entire structure is reinforced, consisting of steel bars inbedded in concrete with their ends interlaced, making a concrete monolith. The exterior walls are faced with marble for the first three stories, glazed gray brick for the next eleven and glazed white terra-cotta for the last story and cornice. The foundations are all of reinforced concrete.

In New York City, when it is necessary to go to great depths for foundations, the pneumatic process is successfully used. In Chicago a system of grillage, on piles, of I-beams and concrete, has been in use for several years. And now that reinforced concrete piles are available, and do not have to be cut off at the water-line to prevent decay, we have a fireproof, windproof and practically indestructible building as the result.

In view of the possibility of conflagrations liable at any moment to temporarily jeopardize the business interests of every city, it is necessary that the requirements for materials and construction of buildings in such districts should be most rigid. It should be made a criminal offense to erect a building that is not fireproof in congested business centers.

The business interests are not the only interests to be safeguarded. Thought should be given to the aesthetic side of a city's life and provision made for it. There should be in force in every city laws regulating the height of buildings. European cities, backed by centuries of art training, regulate the height of buildings on purely aesthetic grounds.

When we consider the last division of our subject, the aesthetic of the skyscraper, we must remember that our aesthetic training is based on the proportions of Classic architecture—the low buildings of the Grecian archipelago. We are appalled at the seeming hopelessness of reconstructing our aesthetic ideas on such a gigantic vertical plane as a skyscraper demands. It may be said that architects have had a vertical problem to deal with before, in the Gothic cathedral. That is true, but the conditions are entirely dissimilar, there was a proportionate breadth at the architect's disposal.

Many of the skyscrapers are on lots so narrow in comparison with their height that little remains to deal with but a vertical streak, as in the acute angle of the "Flatiron" or Fuller building of New York. Attempts have been made to reduce the apparent height of these buildings by the use of repeated horizontal lines. The result of such treatment is seen in pronounced form in the St. Paul Building in New York. Here the designer has grouped two stories together and piled section on section in monotonous uniformity until the client's money-limit was nearly reached, when, in a sublime effort, three

stories are grouped above a sub-cornice and his attempt is finished—a procedure, as one writer puts it, "Quite as sensible as if a man were to thrust his head through the crown of his hat and wear it below his head in stead of above it."

Various other styles of high office buildings are seen. Few are satisfactory in appearance. Their designers strive for effect by dividing the facades horizontally and vertically. Pretentious detail runs riot. All our architecture needs restraint, needs a more refined sense of proportion—a more conscientious use of detail.

There are a few skyscrapers which are designed in a rational way, their architects realizing that the problem is one of vertical design and treat it accordingly, not even attempting to work out the design in any of its existing architectural styles. The original Monadnock Building in Chicago, designed by Mr. John W. Root, is one of the best examples of good design in skyscrapers. It is a building of the severest plainness. The necessary strength of base is secured by a gentler outward curve above the first story, an effect of batter being secured by champfering up the angles, widening as it rises several stories in height. The superimposed stories have plain, rectangular openings. The expanse of blank wall is broken up by shallow oriels, equally spaced, starting above the outward curve of base, at top of second story and extending to the story below the frieze line.

The cornice is formed by repeating the gentle curve of the base. The proportions of this building are so carefully studied that in spite of its austerity it is one of the most pleasing and satisfactory of skyscrapers. The pleasing effect of the building could have been heightened by using a lighter colored material, the dark-colored brick and terra-cotta being almost too somber for such a massive structure.

Among other skyscrapers of successful design there are but two I shall mention as being exceptionally satisfactory. One is the Schiller Building, of Chicago, designed by Mr. Louis H. Sullivan, and the other is the preliminary sketch for the Times Building, New York, by Mr. Cyrus L. W. Eidlitz. This sketch is Gothic and of unusual charm. Unfortunately, the design was modified in construction.

While we have a few individual examples of fine design the problem of effective treatment of the skyscraper is one still open to solution.

* * *

American Society of Civil Engineers

THE American Society of Civil Engineers assembled in annual convention in New York on January 17, 1906.

The Board of Directors submitted an interesting report, showing that there are now 12 honorary members, 2 corresponding members, 1,952 members, 1,021 associate members, 131 associates, 396 juniors and 25 fellows, a total of 3,539, or a net increase of 336 during the last year. Local associations of members of the Society have been organized in Kansas City, Memphis and San Francisco. The report also alludes to the extension of the Society house, which has been accomplished by the purchase of an adjacent lot and building thereon, a three-story addition. The effect of this addition is to make an enlargement of 50 per cent in all the working rooms of the building. The comfort to members provided by this extension was amply shown by the method in which the largest attendance at an annual meeting was successfully handled.

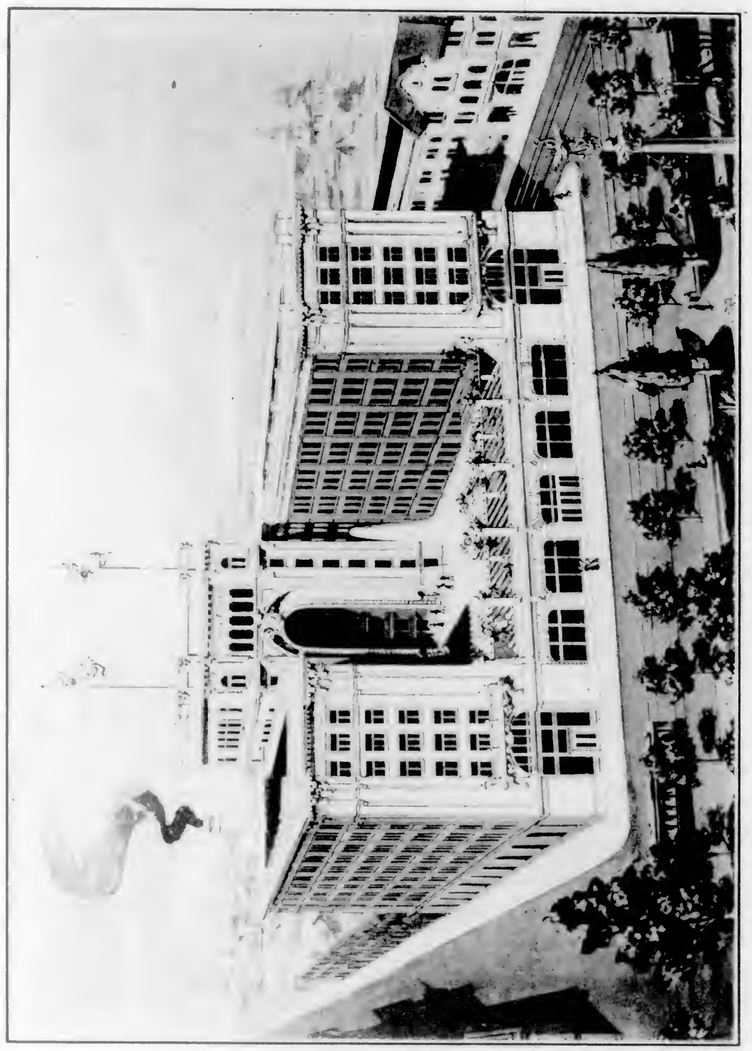
Considerable time was taken up in the discussion of proposed amendments widening the scope of membership and by some change in the description of required qualifications, and the matter was closed by being referred to a committee of five corporate members, one associate member and one junior member, to be appointed by the president, with instructions to report at the next annual convention.

The convention was marked by the largest attendance ever present at any of the conventions in New York, and the receipt on the first day, and the smoker on the evening of the second day fully taxed the increased capacity of the building. Admirable arrangements were in force for the seating of all present during the collation hours, the members being able to enjoy the spread in comfort.

The boat excursion through the Brooklyn Navy Yard and the Bush Terminal Company's plant started in rain and fog on a most discouraging morning, much to the sorrow of some of the less courageous ones who backed out owing to the bad weather. Those who stayed by the boat had a most enjoyable trip and returned amid brilliant sunlight.

Frederic P. Stearns, the well-known engineer of the Metropolitan Water Board of Boston, was elected President for the year: Onward Bates and Bernard R. Green were elected Vice-Presidents; Joseph M. Knapp was elected Treasurer, and Wm. B. Storey, Jr., James M. Johnson, Wynkoop Kiersted, Emil Swensson, J. Waldo Smith and George Gibbs were elected directors.

Detail of First Church of Christ, Scientist, Oakland *Henry A. Schulze, Architect* C-366



Harrison Albright, Architect C-367

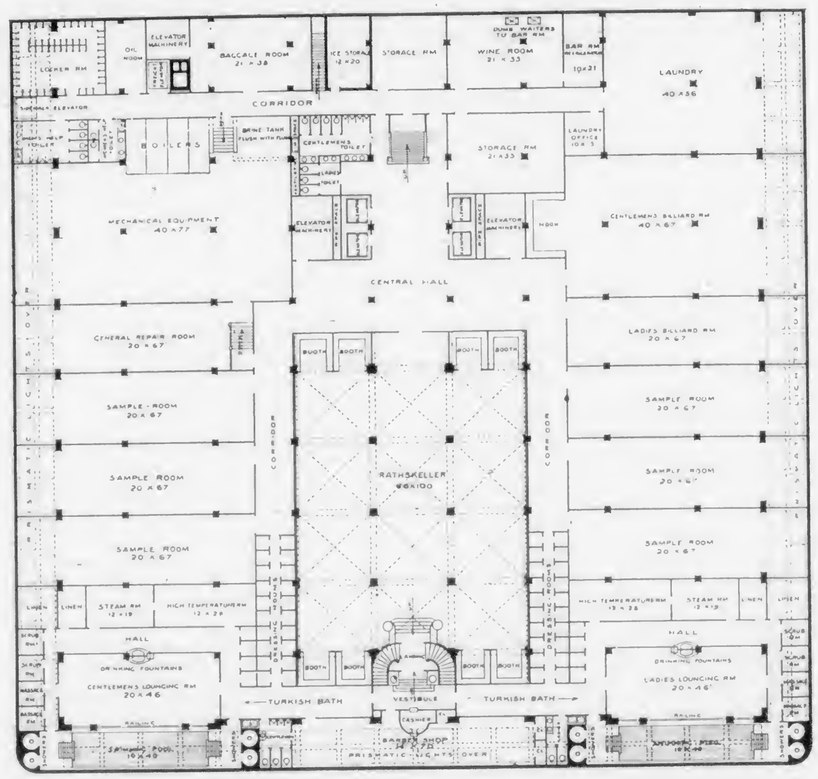
The U. S. Grant Hotel, San Diego, Cal.

San Diego's New Hotel

U. S. GRANT, JR., son of the distinguished general, is to build an immense hotel in San Diego that will be unique in that the material to be used will be reinforced concrete. The hotel will be 200 x 200 feet and will occupy the site of the old Horton House. Harrison Albright is the architect.

Above ground the building will be in the form of the letter E, and in the six stories which comprise this part there will be 400 bedrooms and 200 bathrooms, each bedroom having access to adjoining bedroom and bathroom, and each bedroom containing clothes closet, lavatory, radiator and long-distance telephone.

The basement will extend to street curb, and will contain rooms for mechanical equipment, consisting of the following plants: Heating, lighting, refrigerator and laundry. It will also contain rathskellar, billiard rooms for both ladies and gentlemen, barber shop and fifteen commodious well-lighted sample rooms for the use of commercial men.



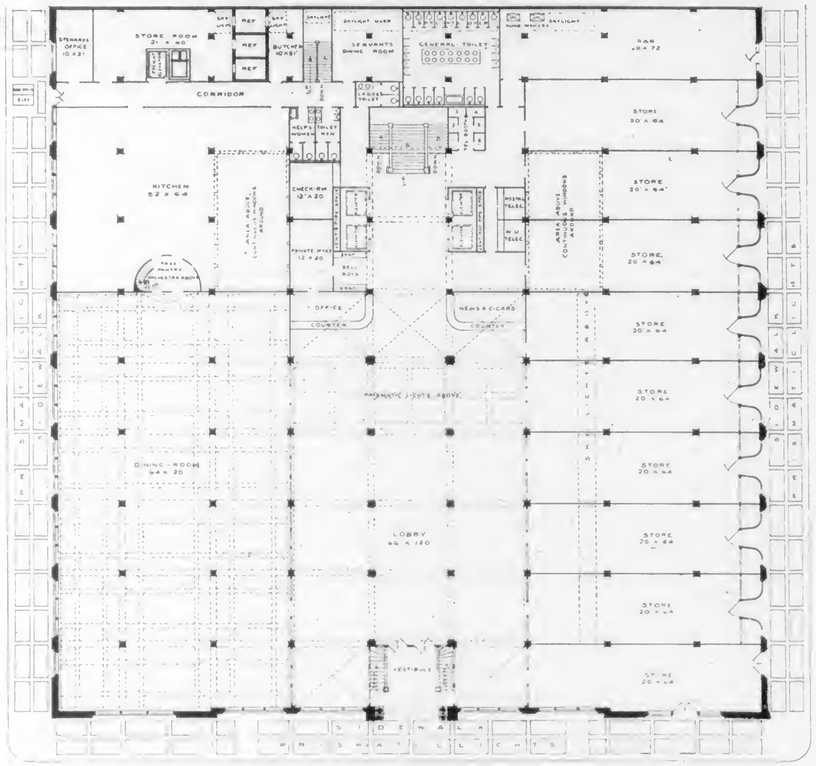
U S GRANT JR OWNER
SAN DIEGO CAL

BASEMENT — PLAN
U S GRANT — HOTEL — SAN DIEGO; CAL

SCALE 16 FT TO THE INCH

HARRISON ALBRIGHT ARCHITE
HOMER LAUGHLIN BLDG LOS ANGELES

C 368



First Floor Plan, U. S. Grant Hotel, San Diego, Cal. C-369

The central portion of the first floor will be occupied by a lobby 66 x 172 feet, the rear portion of which will be subdivided into office, private office, telegraph and telephone rooms, news and cigar stand, checkroom, public lavatory, writing rooms, etc. To the left of the lobby will be the dining-room, 66 x 100 feet, kitchen, 56 x 72 feet; steward's office, storerooms, refrigerator rooms, etc. To the rear of the lobby will be the bakery and dining-rooms for officers and servants. To the right of the lobby will be a cafe 30 x 90 feet, barroom 30 x 66 feet and seven stores, each 20 x 66 feet, all of which will have entrances from Fourth street and lobby.

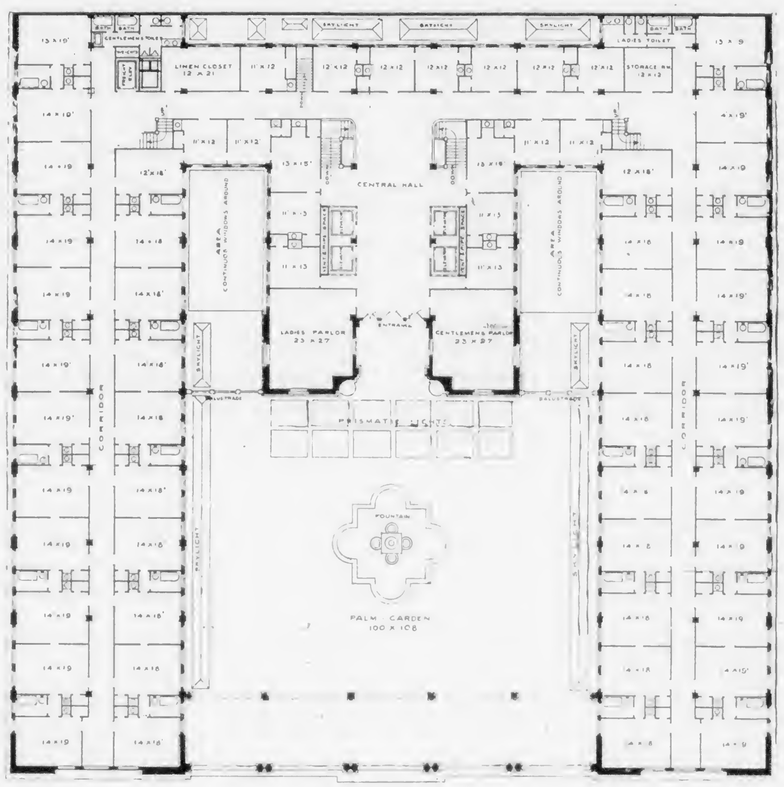
The eighth floor will contain ballroom 60 x 66 feet, adjoining which and opening therefrom will be lounging, toilet and checkrooms for both ladies and gentlemen.

The open space on the second floor, between the two wings, 100 x 112 feet, will be devoted to a palm garden, the entrance being under the great arch between the ladies' and gentlemen's parlors, both of which overlook the palm garden, the "Arch of Welcome" at the rear of the palm garden, the Pergola in the front of it and the fountain in the center are features that will linger long in the minds of those who visit the hotel.

The footings, columns, girders, floors, walls, etc., will be constructed of reinforced concrete. The exterior of the building will be faced with cream-colored glazed terra cotta. The floors of the lobby, cafe, barroom, toilet rooms

and bathrooms will be Mosaic tile. The floors of the billiard rooms and ballroom and parlor will be wood Mosaic. The floors of all other rooms and corridors will be cement, with fastenings for carpets embedded therein. The walls of all the rooms throughout the entire building will be decorated.

There will be four high-speed passenger elevators, one freight elevator, two sidewalk lifts, all of which will be operated by electricity.



Second Floor Plan, U. S. Grant Hotel, San Diego, Cal. C-370

Concrete Resists Fire

Reinforced concrete has great fire-resisting qualities.

After the Chicago conflagration a commission investigated the comparative fireproof qualities of materials in the ruins and reported in favor of the same in the order named—concrete, brick, stone.

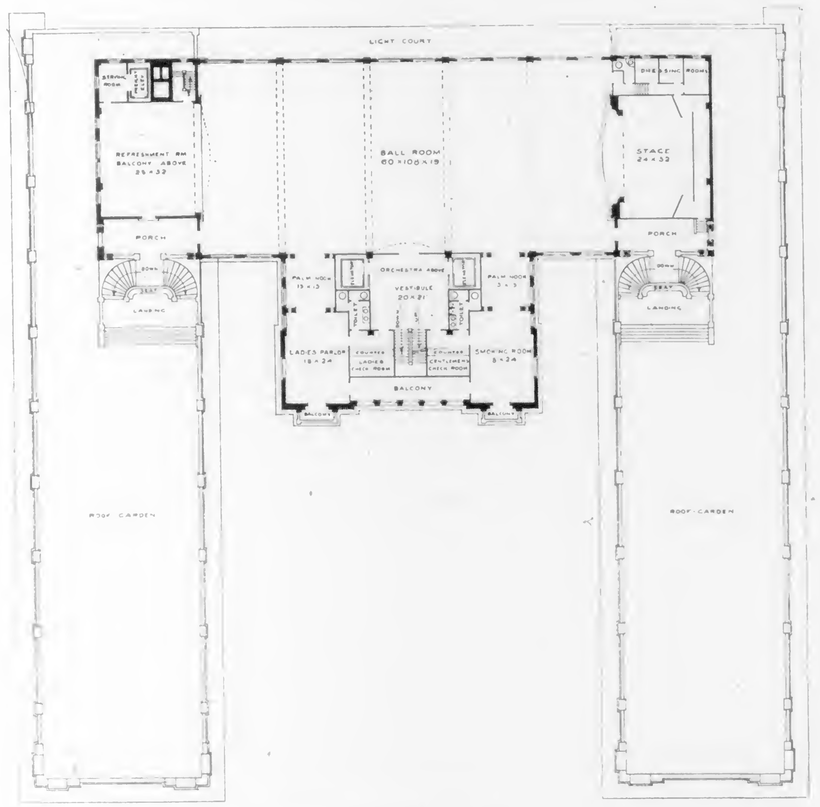
The conflagrations in Boston, Baltimore and Rochester swept streets of granite blocks into ruins more quickly than if they had been of wood. Sheets of flame spread over ranges of granite warehouses, slate flew into fragments, iron columns, girders and beams warped and bent, while the granite blocks cracked, tumbling the so-called fireproof piles into heaps of ruins.

Probably no better and certainly no more expensive and thorough tests could have been devised than those in Baltimore in connection with the United

States Fidelity and Guaranty Company's building and the International Trust Company's building, both of which were built entirely of reinforced concrete under the Hennebique system.

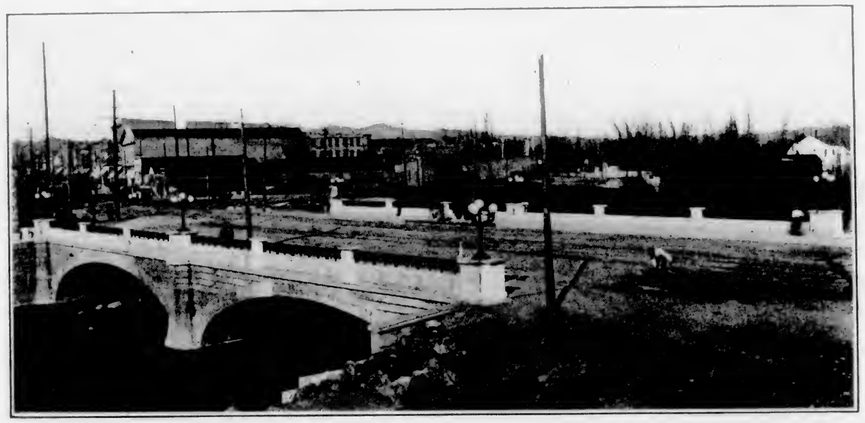
In connection with the International Trust Company's building, the first floor, supported by concrete columns, and the mezzanine floor, extending only in the rear, also supported by concrete columns, sustained perfectly the fall of the Adams Express Company's building which adjoined it. The Adams Express Company's building was six stories high, and the fire having gutted it, the side walls fell on the large skylight of the International Trust Company's building, crushing it and reaching the concrete floors with a tremendous force, but without injuring them. These floors so protected the vaults that their contents were removed undamaged, and tests of the floors showed that they had not been weakened by the fire or by the fall of the adjoining building.

The buildings referred to were in the center of the region of the most intense heat in which granite, stone, brick and tile were entirely destroyed. They were absolutely fireproof against the fire and are today the best examples of truly fireproof structures.



Ninth Floor Plan and Roof, U. S. Grant Hotel, San Diego, Cal. C-371

Cement and Concrete



Reinforced Concrete Bridge, Reno City, Nev. *John B. Leonard, Engineer* C-372

The Reno Reinforced Concrete Bridge

By W. P. DAY

WITH the development in the west of reinforced concrete as a structural material has come its application to the arched bridge, and its adaptability to this type of structure is becoming a recognized fact. With its use in this connection comes durability, strength and a general pleasing appearance to the eye, and this latter condition, especially in city bridges of the type with which this article intends to treat, is one which must be striven for by the successful bridge designer.

While it is true that the first cost of a reinforced concrete arch is a little greater than that of a steel bridge for similar conditions, a proper treatment of maintenance expenses for, and a determination of the life of, a steel bridge, is convincing evidence of the superiority of masonry construction over that of steel.

With these facts before them the Reno board having in charge the contemplated bridge, called for competitive designs for a structure to span the Truckee river, on Virginia street, in the city of Reno, Nev. After considerable deliberation the board accepted the design of Mr. Jno. B. Leonard, a consulting engineer of San Francisco, and with whom the writer had the good fortune

to be associated. The contract for the construction of Mr. Leonard's design was awarded to Cotton Bros. & Co., contractors, of Oakland, Cal., and they have but recently completed the work.

The bridge, as it stands, is composed of two spans of 61 feet 6 inches in the clear; the center pier is 9 feet wide at the top and 10 feet at the bottom, resting directly on large boulders packed with gravel. The distance, center to center of railings, is 80 feet, divided into 12-foot sidewalks, one on each side, and a roadway of 56 feet. The sidewalks are supported by transverse walls which, in turn, are supported by the rib itself. The outward thrust of the earth is taken by light spandrel walls reinforced with ¾, ⅝, and ½-inch corrugated bars placed horizontally, and ½-inch vertical bars, spaced 2 feet, the latter of which serve to distribute the stresses upon the former. The spandrels are held in place by reinforcing each of the walls supporting the sidewalks with three ⅞-inch bars placed diagonally; the transverse walls then have two functions—they support the sidewalk slab and act as buttresses connecting the spandrel walls to the arched rib. The arch rings have a clear rise of 11 feet, the concrete being 2 feet thick at the crown and 3 feet 6 inches at the haunches. Both the extrados and intrados are five centered, the rib bending in abruptly at the springs. The designer was confronted with the problem of making as large a waterway as possible, and this condition made necessary the choice of a rib approaching the ellipse in shape.

The reinforcement of the arch proper consists of 1-inch bars spaced 6 inches near the extrados at the springs, and ⅞-inch bars spaced 6 inches near the extrados at the crown. Near the intrados at the springs 1¼-inch bars are spaced 6 inches and ⅞-inch bars are spaced 6 inches near the intrados at the crown. These bars are interlaced with ½-inch bars at intervals of 2 feet, both at the extrados and intrados, and, as in the spandrel walls, the ½-inch bars serve to distribute the stresses upon the main reinforcement.

The sidewalk slab is 3½ inches in thickness and is reinforced with 16 gauge expanded metal. The slab is carried by sidewalk beams resting upon the buttress walls and reinforced with five ⅞-inch bars and five ¾-inch bars respectively. The sidewalk beam nearest the roadway is finished with a 6 x 4 x ⅜ angle to form a curb, the latter being anchored to the masonry by ¾-inch bolts bent into the beams and countersunk in the angle.

The contractor was permitted to use his own devices for supporting the forms, it being specified only that the maximum fiber stress in bending be 1,400 pounds per square inch; for bearing, 300 pounds per square inch; and for shear, 100 pounds per square inch.

The concrete for the different portions of the structure was prepared in the following ratios:

For the portions of the foundation below the reinforcement members, 500 pounds of cement to 11 cubic feet of sand to 26 cubic feet of stone; for the arch spandrels and wing walls in the ratio of 680 pounds of cement to 14 cubic feet of sand and 21 cubic feet of broken rock. This latter proportion was used also in the railings and sidewalks, but the maximum dimension of broken rock for the concrete for these parts was limited to 1 inch. In placing the concrete for the abutments, it was considered good construction to use large boulders, which were easily obtained close by. Golden Gate cement was used throughout the entire work.

Drainage was provided for by three sets of 4-inch pipes—three to the set,—extending from the spandrel fill to the inside of the rib.

The Reno bridge is a monolithic structure and contains 2,200 cubic yards of concrete and 115 tons of steel. The reinforcement throughout consists of corrugated bars with an elastic limit of 50,000 pounds per square inch. The architectural features are fully shown in the illustrations. While many

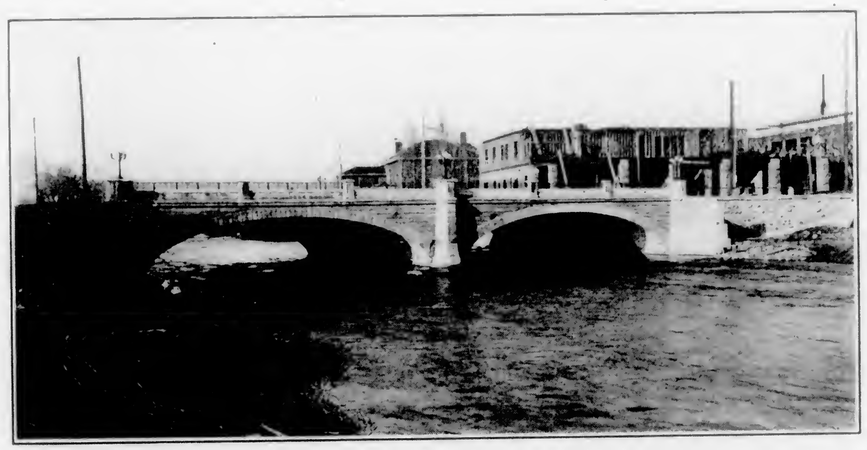
bridges of this type have been built in Europe and in the east, the west has been slow to recognize their adaptability. The successful construction of the Reno bridge, however, seemed to point out the economy of the more durable structures, and it was followed in quick succession by three reinforced concrete bridges in California, one of which, the Pollasky bridge, was described in a previous issue of this journal.

❖ ❖ ❖

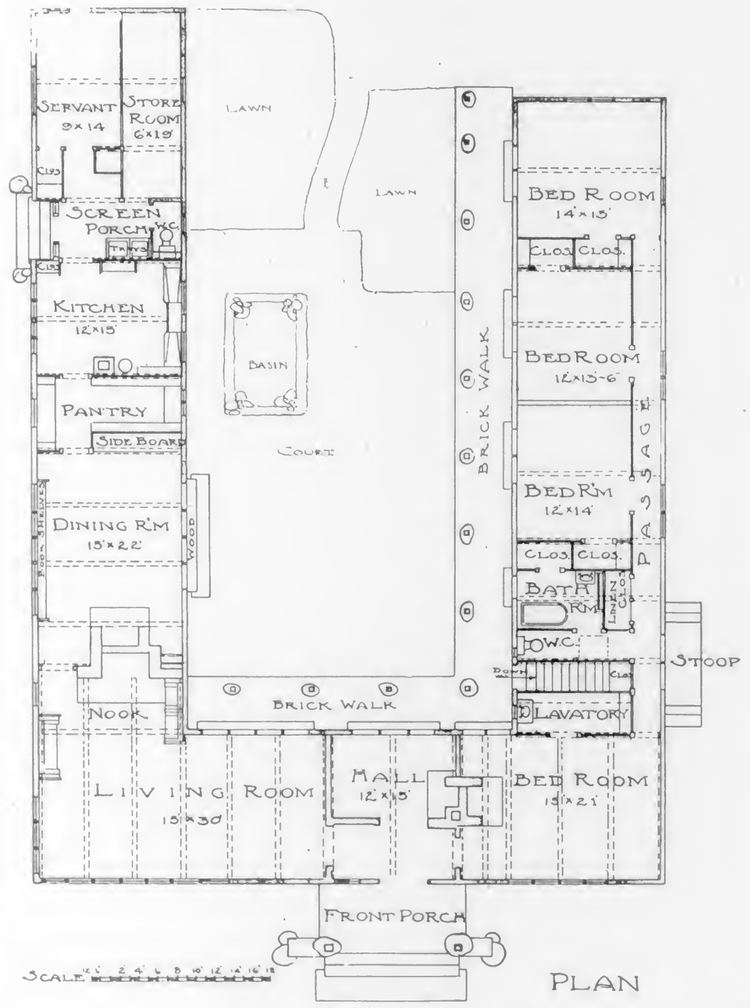
Indian Architecture

IN AN article in the Manchester Guardian under this heading, "F. M. S.," Professor Simpson says:

"In Indian architecture the buildings of some races are all lintelled, whilst others are arched and domed. 'An arch never sleeps,' says the Hindu proverb, and the Hindu, therefore, doubts its stability and leaves it severely alone. He spans his openings by beams—by a single one if the space be narrow, by many if it be of considerable width. In the later case the beams are placed one on top of another, and each in turn projects in front of the next below, like a bracket. He does not object to the shape of the arch, or at all events he did not in the past. On the contrary, he used the form frequently when building in stone. But his arch is not a true arch. He laid his stones, as he laid his beams, horizontally. In the north of India there are many Hindu domes, and one would have thought that these would have been built as the Byzantines built them, and as we build them now. But no: the same principle of beam on top of beam—in this case they cross one another, generally diagonally—is followed, until the opening at the top is sufficiently small to be closed by a single piece of stone. The Mahometans built quite differently. A mosque was not a mosque, a tomb not a tomb, unless it had an arch in it. For some time they were dependent on Hindu labor, and their arches, although of Saracenic form, are built in Hindu fashion. But about the middle of the fifteenth century they learned to build more correctly, and many of their subsequent arched openings are amongst the largest and finest in existence. Moreover, they built domes which can hold their own with any in Europe. The dome over the tomb of Mahmud at Bijapur is 135 feet in diameter, practically the same width as the dome of Florence Cathedral. But the Florentine dome and the wall below it are the same in plan, octagonal, whereas the Indian dome is a circular one placed above a square. The difficulties of construction were thus increased enormously, and the manner in which they were overcome in both beautiful and ingenious."

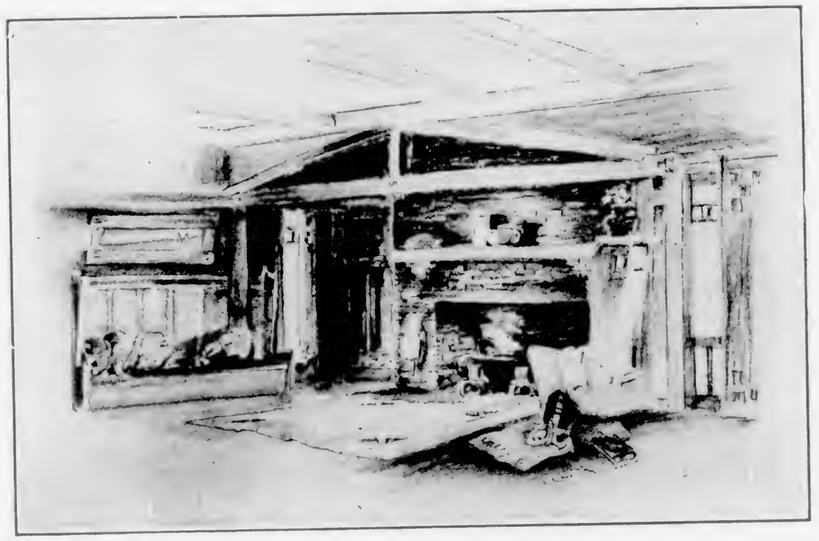


Another View of Reinforced Concrete Bridge, Reno City, Nev. *John B. Leonard, Engineer* C-373



Floor Plan of Court Residence of Mr. C. W. Hollister, Hollywood C-374

Court Residence of Mr. C. W. Hollister, Hollywood · *Greene & Greene, Architects* C-375



Living Room in Court Residence of Mr. C. W. Hollister, Hollywood C-376

Steel for Reinforcements

By A. L. JOHNSON, M. Am. Soc. C. E., St. Louis, Mo.

THE history of the origin of reinforced concrete has been published so often that the speaker will not enter into this part of the subject further than to say that he thinks too little credit has been given to Thaddeus Hyatt, an American, for the work he did in the year 1876 and 1877 in England. He made numerous tests of reinforced concrete beams at Kirkaldy's laboratory, reinforced with bars of different patterns and arrangements, developing at this early date the advantages of stirrups, of having them connected to the bar, of bending bars up at the ends for shearing provision in short beams, ical bond, though his investigations here did not enable him to learn the criteria for differentiating the efficient from the non-efficient.

Up to the time of Hyatt very little work in reinforced concrete had been done abroad, other than in tanks, vases, pots, etc., in which the section was entirely in tension, and in which, therefore, there was little tendency for different movement on the part of the metal and the concrete, such as occurs in reinforced concrete beams. Neither had there been anything of consequence in the United States, about the only instance now known being a building constructed entirely of reinforced concrete by Ward in 1875, in the State of New York.

Ransome made some experiments in San Francisco on reinforced concrete beams, and on September 16, 1884, received a United States patent on a floor construction of concrete reinforced with square bars twisted, claiming as advantages over plain material an increase in tensile strength and a more secure bond. Later, he applied for and secured a patent on a triangular twisted bar, the contention for patentability being that this bar would not split the concrete ribs in which the bar was enbedded, owing to the deeper cupping that would be obtained in the triangular type. Mr. Ransome's theory of the splitting action noticed is explained in the patent as follows:

Assuming a Tee beam, or ribbed floor construction, in which the rib is reinforced with a steel bar, when the floor is loaded, the bar being bent up at the ends, it is as if the rib were held up by the bar, or sitting on the bar. If the floor is loaded to, say, 400 pounds per square foot, and the ribs are, say, 3 feet apart, then there is a vertical load of 1,200 pounds on top of the rib for each foot of length. Hence, the rib acts as a column, being supported on the bar at the bottom. As the bar is narrow, there is a tendency for the concrete to flow each side of the bar, or, in other words, there is a movement of the concrete above the bar, crosswise of same. In a plain bar there would be no obstruction to the movement. In the square twisted bar there was not, according to Mr. Ransome, sufficient obstruction to the movement, as the cupping was not sufficiently deep. Hence the superiority of the triangular type.

The above theory was, of course, fallacious, and the type never came into commercial use. The vertical load on the rib for any given length is carried by vertical shear in the concrete, and the rib is not acting as a column at all. If it were, in the case mentioned where the rib carried 1,200 pounds per lineal foot, supposing the rib to be 4 inches, this would only give a compressive stress in the rib of 25 pounds per square inch, and would be too small to be noticeable even if many times this amount.

The ribs do not act as columns, but as beams, lengthening on the bottom and shortening on top, and it is the movement of the concrete lengthwise of the bar which the bar must be calculated to resist, and it is in this resistance that it begins to help carry the load and become an integral part of the structure. To offer

reliable and satisfactory resistance to this movement of the surrounding concrete along the bar, it is necessary for the bar to have on its surface projections, or depressions, the sides of which are nearly at right angles to the direction of the movement, which is to say, to the bar itself. It is not necessary that the sides of these ribs or depressions should be exactly at right angles to the bar to develop this efficiency, however, it being possible to vary therefrom an amount equal to the angle of friction between the concrete and the metal, which, on the average, will be between 30 and 45 degrees. But if the surfaces against which the concrete presses are nearly parallel to the direction of the movement, we have the same action as when an ax is forced into a block of wood, a very heavy splitting component resulting, which may be many times as great as the direct force itself, similar to the action of a toggle joint.

Of course, this splitting action is of little effect until after the so-called adhesion of the concrete to the surface of the metal has been overcome. This adhesion is not really adhesion at all in the sense that two pieces of wood may be made to adhere to each other by means of glue. The appellation has been given to the resistance of a bar against withdrawal from a block of concrete. As a matter of fact, this resistance is made up of two parts, friction and a mechanical bond caused by the entering of the cement particles into microscopical pores on the surface of the metal, which particles have to be sheared off in withdrawing the bar. For short depths of embedment these two forces amount to about 500 pounds per square inch of bar surface for bars of ordinary mill surface and for good concrete, where perfect union exists between the cement and the metal. Of this, friction contributes about 25 pounds per square inch, the remaining 475 being due to the mechanical bond. There is therefore no reason in advocates of plain bar reinforcement decrying mechanical bond, inasmuch as the plain bar has really no value not contributed by this same quality. The bond, it is true, is of a microscopical nature, but nevertheless its value is considerable, and if it would remain intact we could design and execute reliable concrete structures with plain bar reinforcement.

There are a number of things, however, tending to impair a bond of this nature, amongst which we may mention the following:

1. Shocks and vibrations continued through years of service are liable to injure, if not wholly destroy, the bond, and have done it in cases under the speaker's own personal observation.

2. Where the concrete is continually wet, the adhesion will be cut down from 50 to 60 per cent. in less than one year, as indicated by the experiments of Brueillie.

3. The development of the working stress in the metal slightly stretches same, and the cross section is therefore slightly reduced. Suppose the metal has a working stress of 15,000 pounds per square inch, then the proportionate elongation is .0005, and the decrease in the diameter is, with practical exactness, one-half this, or .00025, a quantity which, though small, could be readily measured by an ordinary micrometer, and certainly is far from microscopical.

The advisability of reinforcing bar with a more positive grip on the concrete than that afforded by the roughness of the mill surface of a plain bar, which is, of course, very slight, is not entirely due to the necessity of maintaining continuously the strength of the beam, but also to the necessity of keeping the bars from being exposed to the atmosphere.

We know, now, that in a reinforced concrete beam cracks begin to form in the concrete on the tension side, at an elongation which gives a stress of from 12,000 to 15,000 pounds per square inch in the bars, which is at just about, or even a little below, the working stress usually employed. If plain bars are used these cracks will be far apart and correspondingly large, while if a bar is used having a positive grip on the concrete for every inch of bar, there can be no accumulation of cracking tendency for a considerable length, but there will be a

great many cracks, mostly invisible to the naked eye, until the metal has passed its elastic limit. Such cracks will not be injurious, while the cracks that form with the plain bars might. They amounted to considerable in the tests made about five years ago by M. Considere, as a result of which he reported the wonderful stretchability of reinforced concrete that misled us all for some time. In these tests he bent the beam several hundred times, so that the tension fiber had been stretched from 15 to 20 times as much as plain concrete would stand, then cut a piece 8 inches long out of the middle surrounding the ¼-inch round rod that he used for the reinforcement, and then with great pains and labor cut the rod out of this 8-inch piece of rectangular section, leaving a hole through same from end to end. Now this concrete had been stretched, according to M. Considere, many times as much as plain concrete would endure, but instead of falling apart when the rod was finally gotten out, it was perfectly intact, and he put it on supports, loading it in the middle, and obtained as much carrying capacity as he could have secured with the same kind of concrete which had never been subjected to such severe usage. This seems like proof positive of M. Considere's conclusion. But it developed later that he had taken this 8-inch specimen from between two cracks of considerable size, and that while the rod had undoubtedly stretched as much as assumed the surrounding concrete had not, the end sections slipping back and relieving the concrete. In other words, there was a slip between the rod and the concrete. If the rod he used had been a rod of mechanical bond, giving a good positive grip for every inch of its strength, he would not have had this slip between the rod and the concrete.

The distance between cracks on the bottom of a reinforced concrete beam subject to uniform bending moment, may be discussed as follows:

Let d=spacing of bars in inches.

c=distance from center of bar to surface in inches.

ft=tensile strength of the concrete in pounds per square inch.

s=bonding value of bar in pounds per square inch of surface.

l=spacing of cracks in inches.

The cracks will come at such distance apart that the bond of the bar for the distance equals the tensile strength of the concrete immediately around the bar, having in this respect a close analogy to the distance apart of the shrinkage cracks in a retaining wall.

Then we have for a square bar,

$$deft = 4sl$$

$$\text{or } l = \frac{deft}{4s}$$

On plain bars with real smooth surface s has been found less than 100 pounds per square inch, though, as before stated, for the ordinary rolling mill surface, with careful embedment, it has a value originally of about 500 pounds per square inch. Assuming for allowance for ordinary working conditions, and for reduction due to shrinkage of bar section, an average value of 250 pounds where there is no vibration of consequence, and where the concrete is not wet, as it would generally be in open air work, we have,

$$l = \frac{deft}{1000}$$

For a mechanical bond bar, such as the corrugated bar, for example, this value will be in the neighborhood of 750 pounds per square inch, a value also which will be practically permanent, and for this,

$$l = \frac{deft}{3000}$$

That is to say, the latter type would give cracks of only one-third the size that would be the case in the beam reinforced with plain bars, even under the best average conditions. In the case of open-air structures, subject to vibration for some years, the disproportion might be very much greater than this.

The speaker has often been asked the question, Why is it necessary to use bars of mechanical bond, when abroad, where their experience is much greater than ours, they use only plain material? The question is a very proper one, and requires an explanation. As before stated, it is only in beam work that the necessity for absolute bond between the concrete and the metal exists, and in this line of work the beginning was made in this country in 1882. These structures were intended for floors, and to carry people and loads of different kinds, and not vases, flower pots, etc., of which the foreign work up to that time mainly consisted, all of which was reinforced with plain material. For floors and beam work in general plain bars did not seem a rational material to use, just as a common sense proposition; and the speaker doubts very much whether, if the construction of such work had been presented first abroad, the foreign engineers would have considered the use of plain bars, either. The natural development would have been to have used a form of mechanical bond first, and later, if investigations showed it feasible, come to the simpler and cheaper form of plain material.

A year ago last May the Prussian government specifications on reinforced concrete were issued, and they cut down the safe allowable working stress in adhesion to about 30 pounds per square inch, recommending at the same time mechanical bond whenever possible. The above restriction on the working stress in adhesion made it very expensive, and in many cases impossible to use plain material, so that the recommendation in favor of mechanical bond was scarcely necessary. In France, too, much greater care is now taken, the bars being bent up and down and around about in the effort to obtain a better anchorage, as well as to provide for shearing stresses.

In specifying bars for reinforcement, there are a few fundamental principles that should be observed. In the matter of elastic limit, the general proposition is that the elastic limit should be as high as is consistent with the ductility required by the case in hand, up to say, 60,000 pounds per square inch. There is no object in having a higher elastic limit than this unless the modulus, too, could be raised, which is, at the present time, not feasible. Preference should be given to more bars of small section, rather than to few bars of large section, as it is desirable to have the metal well distributed through the stretching concrete area. The bars should not be painted. A slight film of rust is no injury at all, and will totally disappear after embedment. But if the bars have been exposed long enough for scale to form, this must be removed before use.

In designing, the factor of safety should, generally speaking, be four at least, certainly never less than three, which is based upon the elastic limit. That is to say, the working stress for the actual loads should be only one-fourth of the elastic limit. Many of the municipal building laws are seriously in error in that particular. This will require about three-quarters of 1 per cent. reinforcement for material having an elastic limit of 60,000 pounds per square inch and 1 3-10 for metal having an elastic limit of from 30,000 to 35,000 pounds per square inch. These are the percentages required to develop the full strength of the section in bending. Short beams, having a ratio of height to span of more than one-twelfth, will have to have some of the bars turned up at the ends, where they are not required for moment, to take care of the shear. This bending is readily done on the job cold, unless the bars are exceptionally heavy in section.

Cost of Laying Concrete Blocks

THE cost of laying concrete blocks, especially of the two piece system in this city, is a mooted point. The work is claimed by the Masons' Union and also the Brick Layers' Union, while, in fact, it is not the work of either, but should be of a separate and distinct class of men. The lowest bid obtained during the last week was 14 cents per square superficial foot, and bids have been made as high as 60 cents per superficial foot, which would be equivalent to about $30 per thousand for brick in the wall.

In this respect, replies to letters to various points showing prices paid for laying concrete blocks, two piece system is pertinent.

The Paragon Plaster Co., of Syracuse, N. Y., writes as follows:

"Replying to your inquiry of the 24th, we have nothing to do with the price of laying blocks; our business is manufacturing, and we are also material men. We, however, are not entirely ignorant of what is being done, and we know on large work that a contractor who is up in his business has been able with expert men to lay what would be equivalent to 4,000 brick per man in a day and he was running a 17-inch two-piece concrete block wall. This is certainly three times what a man would lay if they were running brick work, and we consider the 12x24 block for 17-inch wall is the most difficult block we have to handle. From information I have picked up from mason contractors, we believe that 7 to 7½c per block, mortar included, is a fair price."

The Cuyahoga Concrete Stone Co., Cleveland, O., write as follows:

"In reply to your favor of the 24th inst., would say that we are paying contractors 5 cents a cubic foot to lay up blocks. They consider this price sufficient to give them a fair profit on the work."

Will J. Scout, Agent American Hydraulic Stone Co., writing from Chicago, January 25th, says:

"In this city contracts have been taken for 5 cents per block for laying them in the wall. Cleveland plant has contracted on different buildings for the complete erection of the building for 5 cents. We have seen the blocks laid in the walls by masons that were paid 60 cents per hour, each mason having a helper at a cost for labor of less than 3 cents per block. To this must be added the cost of helper for putting the blocks on the scaffold. This is a very reasonable price for laying these blocks in the wall, and the contractor that takes the contract at that figure and works can make a fair margin of profit."

J. A. Fergison, President of the American Hydraulic Stone Co., writes under date of Denver, Colo., January 22d:

"Replying to your esteemed favor of the 19th, a fair average price throughout the country for laying blocks, including mortar, is from 6 to 7 cents per 12x24 block."—Exchange.

Warehouse of Concrete Building Blocks Built by Valley Artificial Stone Works, Fresno C-377

Terra Cotta and Brick

*Brick Making on the Pacific Coast

By JOSEPH SIMONS

BRICK making on the Pacific Coast dates back to a very early period, and is, no doubt, as old as in any section of our country.

The old ruins in parts of our State, where a form of civilization once existed previous to the arrival of the white man, have their remnants of pottery and brick. Specimens of the pottery are similar to those found in old Mexico. The brick are of the unburned or adobe kind. Since then the clay interests of the Coast have developed, and we at the present time have every class of machinery, every kind of kiln and most every contrivance that is known to the clay-working industry in operation in our State.

Our clays are numerous and composed of various ingredients, a large per cent having derived their source from the disintegration of our mountains and hills, where, through ages of time, they have disintegrated and waters have washed them and deposited them in their present beds. The clays from this source, owing to a large per cent of oxide of iron, burn red. We also have deposits of clay burning white and all intermediate colors. When the same has been carefully selected it makes an excellent brick superior in many respects to the brick made in Eastern countries. Paving brick are now being made by our friend, Mr. Frost, which are excelled by none. Of late the attention of the clay workers is being directed to terra cotta and building tiles.

We also have with us the promoter, who derives his livelihood from the rake-off he gets from the manufacturer of machinery. He makes brick with this or that process, sets them, burns them and delivers them for less than a dollar a thousand, but it is all on paper.

Our country, like others, is strewn with mistakes and wrecks; people imagining that all they need is a machine, power to run it, an engineer at the throttle, some one to stand around and look wise and brick are made and burned without any skill whatsoever; and many are the sad stories we listen to from such ill-advised people.

But casting aside our troubles, looking on the bright side, we find in California many very prosperous brickmakers. We have many up-to-date and well-equipped yards. We see the gleam from many an eye that denotes prosperity.

Taking up our Bible and reading of the trials and tribulations of the ancients, we find that the children of Israel also had troubles, and one of them was owing to the making of brick. They were compelled to make brick without straw, meaning, as I would interpret it, a burned brick. To make the brick with straw, all that was necessary was to chop up the straw, mix it with clay and sun dry it. To make brick without straw, they were compelled to rustle the wood—

* Extracts from Letter read at Brickmakers' Convention, February, '06.

no doubt from some far mountain—and this made additional labor, and they being no different from our brickmakers of today went on a strike, and rather than to make burned brick followed Moses forty years in the wilderness. While I am interpreting the Scriptures to you I wish to say that my Biblical researches have convinced me that the feat which Sampson accomplished in breaking the great columns which wrecked that mighty building was not due to his strength, but to the fact that the columns which gave to the building its main support were erected of reinforced concrete or cement blocks, and it only needed a little shove to push them over.

The writer considers it his duty every year or so to pay a visit to Eastern cities, and has called on and personally met the representatives of many of the largest clay working industries of the East, and from them has derived much information, and he must confess Eastern troubles are our troubles, that Eastern mistakes are the same as our mistakes, and the same cry of low prices, too much competition and not enough bricklayers is re-echoed from every State in the Union.

With us the sand lime or mortar brick has come and gone, and the sparrows now make their nests in the elevator buckets and shoot the chutes on the screens, and after a loss of many thousands of dollars, the investors in such plants have learned that carbonate of lime and sand is only mortar, no matter whether it is dried quickly or slowly, and if they want their building to have an appearance of sand finish, it is cheaper to plaster it with a coat of lime mortar than to press the same into bricks and pay $6.00 a day for laying them up.

The cement block and reinforced concrete fad is now having its rage. In dozens of back yards and on back streets can be seen little hollow block plants, the poor workman, laboring with might and main to tamp sufficiently hard his one to eight mixture so that it will withstand the slight test imposed upon it.

At the present time an assumingly new class of construction is being revised. I have in my hand a four-column newspaper article written by one of our leading promoters of plaster of Paris and twisted bars, saying that he has lately discovered that the pyramids of Egypt were built of concrete; and the dome of the Pantheon in Rome, one hundred and forty feet in diameter, was constructed of the same material; that the ancient Greeks and Romans used it exclusively, inferring that the civilized world was in darkness till he received his inspiration.

But we, as manufacturers of burned clay products, are abiding our time believing that the great builders of the past, who used our material in the structures which still remain to tell the tale, were not fools, and when twitted by our reinforced friends that our business will soon be ruined, we tell them that it is unnecessary to have any walls or floors at all to a building; that all you need to do is to think you have a building and you have one—suggesting Christian or Mental Science for the erection of structures.

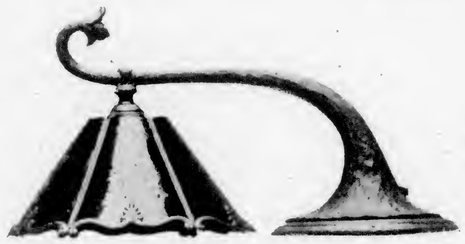
But it is an ill wind that blows no good. We have recently formed, in the City of Los Angeles, an organization of all the burned clay interests, having about four thousand interested parties connected; elected officers and are pursuing a campaign of education on such lines as will increase the use of our product, and must say that within the few weeks that our machinery has been in operation we have accomplished marvels. We find that the manufacturers of all other products except our own have agents in the field, are writing articles for papers and using every means to educate the public to use their class of material, while we, as brick men, were sleeping; but we have been aroused; we have buckled on our armor; we have sharpened our swords, and we see victory ahead.

Now a word of suggestion to the brickmakers throughout the United States. Form an organization, employ some good writers, patronize the journals that are distributed and will be read. Educate the public the same as the cement men are trying to educate them, the same as the iron men. Do this without delay, and the star of success will reappear.

Heating, Lighting and Electrical Work

Lighting Fixtures

By. JOHN C. ENGLISH



THE mission of lighting fixtures is two fold, to *illuminate*, and to *decorate*, the latter being by no means of minor importance." The first portion of this statement is a self-evident truth requiring no demonstration as the very fact of their being demonstrates their use. The latter portion, however, has been greatly neglected in residence lighting, especially where the occupant has not felt able to expend sufficient money on his interior decorations and furnishings so as to carry out a well-defined scheme, or better still treat the various rooms in distinct architectural periods. In either case the lighting fixtures should be given no small amount of consideration. This does not mean that they should be the most conspicuous feature in the room and this should be carefully guarded against, as at night when fulfilling their office as lighting instruments there is danger of making them too important looking to the disparagement of the balance of the room but the ideal condition is obtained by a room being illuminated so that you feel plentifully supplied with light, but the source of it not calling for special notice, in other words, when furniture decorations and lighting fixtures are all parts of the harmonious whole.

Let us consider for a moment the lighting of a living room of generous proportions such as some of our local architects are designing for the first floor of our simpler homes or the principal assembly room of the family on the second floor of more spacious residences. The woodwork generally of redwood with a simple wainscoting 4 or 5 feet high, ceiling height about 9 feet 6 inches with beam construction. The mantel generally of clinker brick very simple in detail, walls lined with bookcases here and there to break the monotony of plain surfaces as well as to have the favorite book close to hand. Ceiling cream, walls any plain color, often brown or green.

In lighting any living room, two general principals should be considered. *First,* General lighting; *Second,* Special lighting. In the room above referred to the general illumination could be handled by a ceiling fixture operated by a switch placed conveniently near the entrance door, and in large rooms it is advisable to wire this fixture in two circuits so as to turn on all the lights or a portion of them, the object being to have well in hand the amount of general illumination required. When this is done it is well to select a design having say 5 lights, 4 arms and one light hanging from the center body so as to use the lower light only without the fact that the other 4 lights are out, being very conspicuous

(see design.) This ceiling fixture should give all the general illumination necessary and it is one of the instances where low candlepower lights can be used to advantage. For instance, 5-8 c. p. lamps would give a beautiful effect and burn no more current than 2-½ 16 c. p. lamps. Mica or art glass can be beautifully employed here especially, using lanterns with open or white mica bottoms as the art glass can be handled to make a harmonious contrast with the ceiling and beams, and the lanterns being open at the bottom, you sacrifice nothing from a practical standpoint.

The special lighting can be subdivided into *first*, reading lights; *second*, bookcase lights; *third*, mantel standards; *fourth*, brackets. The reading lamp should be placed on the principal table and should receive its current from a floor plug directly underneath, and in wiring, when the table is not definitely placed, it is advisable to provide two or three outlets in various portions of the room. Bookcase lights are very useful and they obviate the necessity of turning on all the lights in the room to read the title of a book thereby disturbing all the other occupants of the room. The ideal lamp is not dissimilar in form to the conventional roll-top desk portable where the light is on a level with the bookcase especially as it will not interfere with the opening or closing of the doors of the bookcase (see design). Here also, a lantern or an open shade supplied with a pull-socket will fit in admirably. Mantel standards should, if possible, express the individuality of the occupant, old candlesticks made over being much more interesting than those made to match the balance of the lighting scheme.

Brackets can be placed here and there, not necessarily in pairs and should be preferably 2 lights and in this way offer a splendid opportunity for the introduction of emergency gas, or better still, if emergency gas is necessary, place a bracket gas only, near the center of the room and with the use of the "Bunsen Socket Burner" it will look exactly like the electric brackets and when lighted give an efficiency equal to ten 16-c. p. lamps. This efficacy would be greatly appreciated in such emergencies as the recent destruction of the local electrical company's power house, where the current was withheld for two or three days.

In general, the subject of lighting fixtures is too often put off until the eleventh hour, and contracts let on a basis of purely commercial commodity, while if considered at least before the house is wired many valuable suggestions could be offered which would be of material advantage, from an artistic, practical, and economical standpoint.

* * *

Architectural League of America

The Executive Board of the Architectural League of America, with headquarters in the Board of Education Building, St. Louis, has been filled by the election of the following: President, Ernest J. Russell; Vice-President, Frederick M. Mann; Corresponding Secretary, Wm. B. Ittner; Recording Secretary, Ernest Helfensteller, Jr.; Treasurer, John C. Stephens; Samuel L. Sherer, Jesse N. Watson. Chairmen of Committees—Publicity and Promotion, John Molitor, Philadelphia; Current Club Work, J. P. Hynes, Toronto; Education, Newton A. Wells, Urbana, Ill.; Co-operation With the Institute, Wm. B. Ittner, St. Louis; Civic Improvement, Frederick S. Lamb, New York; Foreign Scholarship, N. Max Dunning, Chicago.

Electric Wiring of Buildings

HOUSE owners and builders do not appreciate the importance of proper specifications for wiring buildings for electric light in order to make it safe and most serviceable. As a rule wires are used much too small to carry the necessary current.

This condition is brought about by the ignorance of the public in matters electrical and the lack of proper specifications for the electric wiring in the building specifications furnished by the architects to the contractors.

All other work is carefully covered by specifications, but the wiring is generally passed over as something quite unimportant with the mere statement of the number of lights or outlets and the locations of lights to be "where the gas jets are."

If left to his own devices, says an exchange, the wiring contractor will invariably use only one size of wire throughout the house, and that the smallest size allowed at all by the Board of Fire Underwriters, No. 14 wire.

He will almost invariably connect all of the wires together without any branch cut outs or fuses and depend upon only the main fuse at the point of entrance to blow in case of trouble with the wiring. Wires should be proportioned to the number of lights which they are to carry; the same as water pipes or gas pipes; consequently the main wires should be larger than the branch wires leading to the fixtures.

Wherever a small wire is to connect to a larger wire there must be a fuse or "cut out."

It is more convenient, safer and far more sightly to arrange the wiring so that all "cut outs" and fuses may be installed in a central cabinet box or panel in the wall.

In an ordinary size residence, one of these cut out cabinets is sufficient for the whole house, but in the larger residences it is best to arrange the wiring for a cabinet on each floor.

Where one is used it should be centrally located, preferably in a hall. The three main wires lead to this from the main switch and meter, and the lights in the different rooms should be distributed on several branch circuits leading out from the cabinet and each protected by a fuse in the cabinet.

The rule is that each branch shall not carry current to exceed 660 watts, equivalent to about twelve 16-candle-power lights to a circuit.

The advantage of this plan of wiring is that being cut up into small independent sections, with a few lights on each, small size wires can be used, and even if the contractor uses the smallest size allowed they will still be of sufficient capacity for the number of lights on them, provided distances are not too great.

Other advantages are:

1. Only a few lights extinguished by the blowing of a branch fuse, instead of all lights out by the blowing of the main fuse, usually located in the cellar or attic.

2. No danger of sockets burning out with explosive noises and sparks, and in case of wires becoming crossed or grounded onto the gas pipe at the ceiling the small fuse will be blown quietly before any damage is done to the ceiling.

3. Cut outs being necessary, it is better and more convenient to have them located in one place easily accessible for inspection and replacing of burned out fuses, instead of having a man bring in a tall stepladder to reach a cut out located on the wall or ceiling, the decorations of which he may

injure. The following simple specifications will cover most wiring and are applicable to large and small buildings for concealed wiring:

1. Best approved double rubber covered thinned copper wire must be used.

2. All joints in wires must be soldered, and after inspection must be taped.

3. Wiring must be on three-wire system from point of entrance to the one or more "cut out" cabinets or panels.

4. Cut out cabinets must be arranged for three-wire supply and two-wire branch circuits.

5. Cut outs must have either Edison screw plugs or inclosed cartridge type fuses.

6. Loops must be left for meter connection and a smooth board installed upon which meter will be mounted, at a height not exceeding 7 feet above the floor.

7. A three-pole switch and cut out of ample carrying capacity must be installed at the point of entrance to the building and on the inside.

8. Wires from entrance to cut out cabinet must be of such size as to not cause more than 1 per cent. drop or loss in volts when all lights are lighted.

9. Branch wires from cabinets to outlets must be of such size as not to have more than 1 per cent. drop or loss in volts when all lights are lighted.

Nor a maximum of 12 16-candle-power lights. No. 14 wire can be used for branch circuits not exceeding 31 feet in length one way. If distance is greater No. 12 must be used.

10. All overhead lights to be turned on and off by switches on walls near the doors of each room.

11. Flush push button switches in steel cases preferred.

12. Wires to be kept free from crosses, grounds and open circuits until inspected and covered in, and to be guaranteed and kept free from all defects for one year.

13. Wiring must be done in a workmanlike manner and in accordance with rules of National Board of Fire Underwriters.

14. Contract to include all labor and material, wire, main line switch and cut outs, cut out cabinets and cut outs, and any and all other switches and necessary fittings to make the wiring complete from point of entrance to each outlet, but not to include any chandliers, brackets, fixtures or portable cords.

* * *

A Building Entirely Without Wood

THERE is at present nearing completion in the city of Bridgeport, Conn., a building which is unique in the fact that it contains no wood whatever and which will be when finished as nearly fireproof as it is possible to make it. It is constructed on the cantilever plan, and is supported by foundations of great strength. The walls are of concrete, the floors are of a composition which is fireproof, and the doors, window sills and frames are of metal. The staircases are of the winding type and are made of concrete. The structure is attracting much attention on the part of engineers and insurance men by reason of the fact that the building will be absolutely devoid of wood and that every feature of construction has proved its value, there being no methods employed that are experimental.

Amount of Air Required for Ventilation

By F. H. BRYANT

UNDER the general conditions of outdoor air, namely 70 degrees temperature and 70 per cent, of complete saturation, an average adult man, when sitting at rest as in an audience, makes 16 respirations per minute of 30 cubic inches each, or 480 cubic inches per minute. Under the previously assumed conditions of 70 degrees temperature and 70 per cent humidity, the air thus inhaled will consist of about 1-5 oxygen and 4-5 nitrogen, together with about 1 7-10 per cent. aqueous vapor and 4-100 of a per cent carbonic acid. By the process of respiration the air will, when exhaled, be found to have lost about 1-5 of its oxygen by the formation of carbonic acid, which will have increased about 1-100 fold, thus forming about 4 per cent. while the water vapor will form about 5 per cent. of the volume. In addition, the inhaled air will have been warmed from 70 to 90 degrees, and, notwithstanding the increased proportion of carbonic acid—which is about one and one half times heavier than air—will, owing to the increase of temperature and the levity of the water vapor, be about 3 per cent. lighter than when inhaled. Thus it will be seen that this vitiated air will not fall to the ground, as has often been presumed, but will naturally rise above the level of the breathing line, and the carbonic acid will immediately diffuse itself into the surrounding air. In addition to the carbonic acid exhaled in the process of respiration, a small amount is given off by the skin. Furthermore, 1½ to 2½ pounds of water are evaporated daily from the surface of the skin of a person in still life. If the air supply at 70 degrees is assumed to have a humidity of 70 per cent and to be saturated when it leaves the body at a higher temperature, then at least 4 cubic feet of air per minute will be required to carry away this vapor.

Taking into consideration these various factors, it becomes evident that at least 4½ cubic feet of fresh air will be required per minute for respiration and for the absorption of moisture and dilution of carbonic acid gas from the skin. This, however, is only on the assumption that any given quantity of air having fulfilled its office, is immediately removed without contamination of the surrounding atmosphere; but this condition is impossible, for the spent air from the lungs, containing about 400 parts of carbonic acid gas in 10,000, is immediately diffused in the atmosphere. The carbonic acid does not fall to the floor as a separate gas, but is intimately mixed with the air and equally distributed throughout the apartment.

It must then be evident that ventilation is in effect but a process of dilution and that when the vitiation of the air discharged from the lungs is known and the degree of vitiation to be maintained in the apartments is decided, the necessary constant supply of fresh air to maintain the standard may be very easily determined. For the purpose of calculation, 0.6 cubic feet per hour is accepted as the average production of carbonic acid by an adult at rest and the proportion of this gas in the external air is four parts in 10,000. If, therefore, the degree of vitiation of the occupied room be maintained at, say, 6 parts in 10,000, there will be permissible an increment of only two parts in 10,000 above that of the normal atmosphere, or 2-10,000—.0002 of a cubic foot of carbonic acid in each cubic foot of air. The 0.6 cubic foot of carbonic acid produced per hour by a single individual will, therefore, require for its dilution to this degree 0.6 divided by .0002 or 3,000 cubic feet of air per hour. Upon this basis the following table has been calculated:

Cubic feet of Air Containing 4 Parts of Carbonic Acid in 10,000 Supplied per Person...	Per Hour.	6000	4000	3000	2400	2000	1800	1714	1500	1200	1000	525	375	231
	Per Min.	100	66.6	50	40	33.3	30	28.6	25	20	16.6	9.1	6.2	3.8
Degree of Vitiation of the Air in the Room...	Parts of Carbonic Acid in 10,000.	5	5.5	6	6.5	7	7.33	7.5	8	9	10	15	20	30

The figures indicate absolute relations under the stated conditions, and are generally applicable to the ventilation of schools, churches, halls of audience and the like, where the occupants are reasonably healthy and remain at rest. But the absolute air volume to be supplied cannot be specified with certainty in advance, without a thorough knowledge of all the conditions and modifying circumstances, in fact, the climate, the construction of the building, the size of the rooms, the number of occupants, their healthfulness and their activity, together with the time during which the rooms are occupied, all have their direct influences. Under all these considerations, it is readily seen that no standard allowance can be made to suit all circumstances, and results will be satisfactory only in so far as the designer understandingly, with the knowledge of the various requirements as they have here been given, makes such allowance. The following schedule of air supply, in cubic feet per hour, as proposed by Dr. Billings is here presented as showing relatively the volumes recommended by him in different classes of buildings:

	CUBIC FEET PER HOUR
Hospitals	3,600 per bed
Legislature Assembly Halls	3,600 per seat
Barracks, Bedrooms and Workshops	3,000 per person
Schools and Churches	2,400 per person
Theatres and Ordinary Halls of Auditoriums	2,000 per seat
Office Rooms	1,800 per person
Dining Rooms	1,800 per person

These figures are for buildings in which there is no special contamination of the atmosphere beyond that which their use would indicate. Where smoke, dust, noxious gases or infectious germs are produced, and above all where the illumination is furnished by candles, lamps, or gas, additional provision of air supply must be made. Thus a single 4½ gas burner demands 45 cubic feet of air per minute and the resulting carbonic acid gas, unless sufficiently diluted, or immediately removed, will seriously vitiate the air. The introduction of modern methods of incandescent electric lighting has done much to simplify and facilitate the solution of problems in heating and ventilation.

The air volumes recommeded for ventilation by various investigators of the past century show a constant increase in their quantity as the years progress. As good ventilation is only a relative term, depending largely on one's experience and the possibility of improvement, it must be evident that perfect ventilation in the broadest sense can only be secured in the open air. It is, therefore, the province of ventilation to approach as near this perfection as means and expediency will permit.

The crystallization of public opinion into statute laws, looking to adequate methods of ventilation for school, theatre, church and factory, has resulted in the establishment of a basis or limit which will meet the approval of those upon whom is placed the responsibility of enforcing these laws. Under the law as first passed in Massachusetts, the attempt was made to secure 50 cubic feet per head per minute, but it was soon discovered that such provision would necessitate the remodeling of practically every building in the State. Therefore, financial outweighed all other influences, and the limit was dropped to 30 cubic feet, a figure adopted not because of hygienic deductions but because it appeared upon investigation to be the practical limit attained by existing methods in the commonwealth.

This basis of 30 cubic feet has been very generally adopted throughout the country, and is to-day recognized as the minimum volume to be provided in any system of ventilation worthy of the name. As the benefits of good ventilation are still further recognized and the ability of the fan to provide practically unlimited volumes of air is better appreciated, this limit will gradually rise until we may one day witness the compulsory provision of air for the purpose of ventilation in such volumes as to render further improvement of no practical benefit.

* * *

Uncle Sam an Art Patron

AS a patron of art Uncle Sam is fast assuming a place comparable with that of the Church of Rome subsequent to the Dark Ages, especially as it relates to architecture. This tendency to indicate the dignity of the nation in the designs of Federal buildings is more noticeable in recent years than formerly. There is apparent the sedateness of age, the stability of power, the consciousness of self-reliance reflected in the newer edifices erected for the purpose of carrying on the government of these United States. Leaving out the Capitol in Washington, the buildings erected in the early period of the government were nondescript, inasmuch that they followed no consistent design, and it was only as architectural tastes developed in this country that any attempt was made to correct the faults which made glaringly conspicuous the early public buildings. With the creation of the office of the government supervising architect there began an obvious improvement in the style and design of public buildings. There were a few notable exceptions, both in the National Capital and in other cities, which were and still are examples of a purity of style that made them conspicuous. The present supervising architect, Mr. James Knox Taylor, has held persistently and consistently to an ideal based on what is opposite in the nature of public buildings. He has been guided in his work of selection by advice or suggestion of the ablest architects in the country, with the result that the newer buildings symbolize the greatness, the solidity and the dignity of the government and nation which own them. In this the Renaissance and the modernized Grecian styles are those given the preference. Notable examples of the former are shown in the new buildings, as the Naval Academy, Annapolis, which are admittedly the finest aggregation of buildings in the world, devoted to this purpose. One might travel Europe from one end to the other, visit the great public buildings in the Old World capitals without finding anything to approach the impressive grandeur and beauty of the Congressional Library in Washington. The new Custom House in New York is another notable example of the government's liberal intention to foster the best in art and architecture. The new Custom House in Baltimore, while smaller in magnitude and less elaborate in ornamental detail, is, nevertheless, an illustration of the same high ideal which clearly dominates the planning of Federal buildings. America is yet too young to point with pride to historic ruins, but in the course of ages, should these erected today become roofless and tenantless, the spectator of their crumbling walls will feel that they represented something to be admired and venerated.—Architects and Builders Journal.

Lessons of the First Heavy Storms

By HARRY LARKIN

VISITORS from the East and from Europe laugh at our wood construction, but it suits us, befits our salubrious climate and our earthquakes, and our migratory natures. European mechanics laugh at the way we build locomotives and point with pride to their own copper fire-boxes and rigid frames and general permanent construction. Americans believe in more flexible and cheaper construction both for locomotives and buildings, casting them aside when out of date and adopting improvements as they appear. This principle has been the cause of our remarkable success; we set the pace and the European follows as best he can.

We admit certain little weaknesses in wood construction which a little care and attention will overcome in the building. Siding of any character will admit water during a heavy storm in spite of the skill used in putting it up. Water-proof building paper is the means used to prevent its entering the building and it is the character of this material and the care used in applying it that will make a wall tight. Building paper that tears in our winds is like money thrown away when used. A few dollars more spent in getting good paper will save the carpenter many trips to remedy leaks, after the first heavy storm.

There is no economy in the stiff, brittle papers on the market, although they are water-proof. A soft, pliable material more in the nature of a saturated felt will stand the wind, is water-proof, easier to handle and will not crinkle up like the stiff, high calendered papers do. There are several such sheating papers on the market, among others the "P & B," "W & P" and Starco asphalt saturated felts, the Neponset building paper, etc., and recently an asbestos saturated felt has been put on this market by the H. W. Johns-Manville Company which not only has all the desired qualifications of a good water-proof sheathing, but also is fire-proof, an item that should command its adoption regardless of cost.

In erecting a building where the roof flashes up in a rustic wall a leak is bound to show unless the flashings are "panned in." This will not add to the cost of construction but will save the carpenter, the roofer and the owner a lot of worry.

While speaking of roofs let us call attention to the importance of examining the roof, whatever its character, before the first heavy storms. In localities where high winds prevail during the summer, one would be surprised to see the accumulation of dust and rubbish that will gather on a roof. The dread people have that this rubbish may stop up the sewer, leads them to put screens at the outlets or in the leader-heads. If the first rains are moderate, no damage will be done, but if a heavy down-pour comes, water will bank up over the flashings and ruin the ceilings. The felt and gravel roofs now so generally used have caused owners to become careless in their attentions to that part of the building, as a result the tin on the fire-walls and over the cornices receive no attention until they leak and then they are beyond repair.

A GOOD WOOD BLOCK PAVEMENT.

We (Larkin & Flaherty) had a force of our mechanics at work from 6 P. M. February 21st till 5 A. M. February 23d taking up and re-laying a wood block pavement in Dunham, Carrigan & Hayden Co.'s steel warehouse on Main street, that was laid by this firm when the building was built over 20 years ago.

The building is of brick with wood joist. The sheathing upon which the pavement was laid had rotted so that it had to be replaced. The blocks taken up were in good condition and showed no evidence of the heavy traffic they had carried for these many years. Trucks loaded with iron up to 6 and 8 tons go over the pavement daily, the wheels tracking in a manner that no other character of pavement could stand. The surface permits the heavy loads being started without the horses slipping and does not allow the wheels to sink into the pavement while standing.

A wood block pavement, as laid by us, costs no more than any other character of material and the service this pavement has given demonstrates it to be the most economical pavement for such uses. Unfortunately through the use of asphaltum not adapted to paving, wood block pavements have in certain instances been failures, but where a conservative firm does the work, you may depend upon getting value for your money.

❖ ❖ ❖

Houses of all Glass

MENTION has been made in these columns heretofore of the proposed glass houses in Des Moines, Iowa. The Des Moines Savings Bank, as well as the Methodist Church in that city, are to be built with glass walls, and a 26-story office building of glass has also been proposed. In structures built of this material, the ventilating, as well as the lighting, heating and cleanliness, excel, it is claimed, anything of this character ever before attempted.

These buildings were designed by C. E. Eastman, a well-known architect of Des Moines, whose idea of glass-wall construction includes the use of milk-white, opalescent wire glass one-quarter inch thick, securely fixed in two steel vertical divisions, which are parallel and laced together for the purpose of stiffening. These divisions are supported at the floors by brackets riveted to the steel channels of the floor construction.

The wall thus consists of two glazed screens separated by a foot of dead air space, which affords insulation against heat, cold or sound to as great an extent as would a solid brick wall of the same thickness. The double vertical divisions are spaced about four feet apart. The two glass screens are translucent to any degree desired, so that, in cases where windows are not necessary for reviewing the landscape, they may be dispensed with altogether, provided the building would warrant the installation of mechanical ventilation and heating. The exterior effect is that of a marble wall with or without windows. If windows are desired, it is not necessary to have the regulation two-sash type; but, as the pockets are already provided, single-sash metal windows can be used, lifting up into a metal guide, into the space of the wall. Onyx and many other kinds of stone can be imitated with the glass.

The construction provides approximately an inch for movement at the edges of the glass sheets, which are about 4 feet by 10 feet in size. This will cause any uneven settlement of the building to be adjusted by itself in the framework and glass, without becoming evident to the eye.

A glass wall is of very light weight compared with one of masonry. Fire damage would be local and easily repaired, experience showing that the wire glass prevents the spread of fire, though the glass itself is shattered. With this construction, however, replacing material is easier than would be the reglazing of a window of the same size. The expense of a glass wall is some less than that of a brick wall, and lacks all the disadvantages of the latter, being much lighter in weight, allowing a soft light to penetrate through, and having a surface which is self-cleaning in wet weather, and which, in the case of tall buildings in cities, reflects light to the lower portions at the sidewalk.

The fact that no windows are necessarily required is one of the chief advantages claimed for this method of the method of construction, since the entrance of dust, smoke, insects, etc., through such openings, is rendered impossible. When an outlook is desired, however, plate-glass windows can be inserted.—Paint, Oil and Drug Review.

Notes from the San Francisco Architectural Club.

On Wednesday evening, February 7th, Mr. C. F. Archer addressed the San Francisco Architectural Club on the subject: "Fakes Perpetuated by Structural Steel Manufacturers."

Mr. Archer's remarks were quite pertinent, and he commanded the attention of every one present from the time he commenced until the end.

His statements concerning the steel work in a number of San Francisco buildings were revelations to his audience.

This was the first of a series of talks to be given on the first Wednesday of every month by the different members of the club. The executive officers of the club have elected this to be the best scheme for holding the attendance of the members.

Heretofore the first Wednesday was set aside for the business meeting, but business matters will take up time and the young minds do not care to spend their time on such weighty affairs.

Now the business is all transacted by the executive committee on the last Thursday of each month.

The secretary makes a report of all business transacted at these meetings and reads it the following Wednesday evening before the club. After this reading the lecturer of the evening begins, and he in turn is followed by games and refreshments.

❖ ❖ ❖

The class in steel construction Monday nights continues to be one of the leading attractions at the club. The attendance averages twenty. The problems have been very interesting, and all seem hard, but the teacher's lucid explanations make them appear like kindergarten topics.

They are wrestling with trusses at present, but any new member who wishes to begin may start right in and Mr. Archer will see that he can make up the back work.

❖ ❖ ❖

The class in pen and ink rendering is rather small at present, but those attending are doing very satisfactory work under the guidance of Mr. A. O. Johnson.

Pen and ink rendering does not seem to have the attraction that a knowledge in steel construction does to a young draughtsman.

❖ ❖ ❖

The first competition for the European Traveling Scholarship of the Architectural League of America, under the auspices of the San Francisco Architectural Club, was held last Sunday in the clubrooms. Competitors were required to make their sketches in nine hours, the subject being a "Railway Station." Five members of the club entered and every one completed his sketch before leaving the rooms.

Mr. M. A. Schmidlin, the club's secretary, was the officer in charge.

❖ ❖ ❖

At the convention of the Architectural League of America in New York City a number of visiting architects were interviewed by a representative of the New York Herald. August G. Headman, a member of the San Francisco Architectural Club, and who is at present studying in the University of Pennsylvania, was much impressed by the original manner in which the builders

of structures in the lower part of Manhattan Island had worked out the problems which had presented themselves.

"In engineering skill, in composition and in general effect," said Mr. Headman, "the skyscrapers of New York are wonderful. The skill with which the smallest plots of ground are made to furnish so much floor space is in itself a thing to compel wonder and admiration. The conditions which are met in such construction were not dreamed of fifty years ago. The general effect is, in my opinion, somewhat overdone, especially where the French style is introduced. In time, however, I think that the architecture of New York buildings will become plainer and it will be so Americanized that the French influence will gradually disappear and styles will prevail which are more in keeping with the conditions to be met.

"There is often a tendency toward gaudiness, which I observe especially in the best hotels and other buildings which serve as places of public resort. This, however, is due to the taste of persons who wish to show their money, and the buildings are constructed with the same idea. Before long, however, I think there will be a reaction, and that a less pretentious style of architecture will prevail with the change of ideals of the people.

"There are here now many fine examples of architecture, among which might be mentioned the Stock Exchange, the New York Public Library, which is now nearing completion, and the Custom House, which is, indeed, a great work. I am inclined to think that a hundred years from now a style of architecture will have been developed which will be distinctively American.

"The buildings are not likely to be any higher unless some new elevator system is invented which will enable the elevators to be carried to greater height or there is some other method devised of reaching the upper stories. It takes about so many elevators to carry a certain number of tenants to their offices, and every building must be considered with regard not only to its floor space, but also with reference to the amount of room which will be taken up with an elevator system. When the elevators encroach upon the floor space it is not profitable to build the structure higher, and I am inclined to think that the skyscraper has reached its greatest height, although not for the reason that as an engineering problem it would not be possible to build them higher than they are at present."

❖ ❖ ❖

Small Beginnings of Rich and Famous Americans

Cornelius Vanderbilt ferried his own boat.
John Jacob Astor sold apples in the streets.
Jay Gould was a book agent.
John D. Rockefeller worked in a machine shop.
A. T. Stewart was a school teacher.
John Wanamaker began life at $1.25 a week.
Andrew Carnegie began life at $2.50 a week.
Benjamin Franklin was a printer.
Elihu Burritt was a blacksmith.
Abraham Lincoln was a rail-splitter.
James J. Hill began as a roustabout.
William A. Clark as a young man was a miner.
Henry Villard was a reporter.
Thomas Edison began as a telegraph operator.
Thomas F. Ryan was clerk in a dry goods store.
William Lloyd Garrison was a printer's devil.
Daniel Drew began as a cattle trader.
Henry H. Rogers was a grocer's delivery boy.

Annual Banquet of the San Francisco Exchange

TWO hundred San Francisco craftsmen in the art of construction gathered 'round the festal board at the St. Francis hotel Saturday evening, February 24th, on the occasion of the annual banquet of the San Francisco Builders' Exchange. Architects, millmen, plasterers, plumbers, brickmen made up the cosmopolitan gathering, and the representatives from the organizations akin to the builders were called on during the evening to speak from their various view-points.

John D. McGilvray, the man under whose masterly guidance the hotel St. Francis was constructed, spoke on San Francisco. After reviewing his reasons for coming from the East to enter the stone-building business in this city, Mr. McGilvray said:

"I was fortunate in arriving in San Francisco in the days of her rejuvenation. That was in 1894 and just at the ending of a long period of stagnation in the building industry in this city. The Union Trust Building was the one structure of consequence being erected at that time. Now, after the lapse of twelve years, look at the San Francisco of to-day.

"And to whom is the credit for this great change to be given? I say it shall go to the architects who planned the buildings and the mechanics who carried out these plans. We cannot separate the architects from the mechanics and we do not want to. We have in San Francisco to-day a lot of men designing great things and you, the builders, are building well.

"We have good reason to work for the beautification of our city. San Francisco is the natural inlet of Asiatic commerce and this city must not follow others in building and designing, but must take her place at the head of all such enterprise. Our architects must be the men to plan the beautification of this city and we have the men here who can do it. When we plan and build, let us do so for all time. We must lay out our city and then leave it to the energy of you men here to build up and the enterprise of our own citizens to pay for such building.

"There is no city, and I say this because I have traveled about and observed, that does better building than San Francisco. The people in this city will not stand for the cheap or the shoddy, and that is a most excellent sign. In building we must be our own inspectors. Every man must answer to himself for the class of work he does and if he can honestly answer to himself he can answer to any inspector that lives.

"In closing I would remind you that Chicago taught New York how to build, and now it is up to San Franciso to teach the rest of this nation of ours how to build beautifully, substantially and honestly."

S. H. Kent, president of the Builders' Exchange, acted as toastmaster, and called on the speakers. Brief remarks were made by Thomas McKillican of Oakland, Andrew Wilkie for the millmen, President Anderson for the Builders' Association, G. A. Buell for the planing millmen, W. S. Barnes for the brickmen and President H. A. Schulze, President of the San Francisco Chapter, A. I. of A. James A. Wilson, Secretary of the Builders' Exchange, closed the banquet on behalf of his organization.

The menu for the banquet was gotten up in the form of a booklet and was illustrated with cartoons of prominent members of the exchange, and columns of jokelets entitled, "Material Sounds Heard in the Building."

It was considerably after midnight when the festivities were brought to a close with the singing of "He's a Jolly Good Fellow," in honor of S. H. Kent, the venerable and respected President of the Exchange.

A New Tax on Architects

THE City Council of Oakland has passed an ordinance which levies a tax on almost all kinds of animals, including architects.

The tax or license on a dog, which latter is allowed to run at large, is fixed at a less sum than the tax on architects, probably because it was thought that the dog is a more harmless creature than a knight of the T square. The tax on a stallion, kept for service, or a bull is about the same as that demanded from the poor dumb beast who daily bends his back over a drawing board creating frozen music and other Ruskinisms. Incidentally many commercial pursuits were also taxed, but no other profession was included.

There is some doubt as to what method will be employed to enforce payment of this charge. In the Athens of the Pacific they maintain a poundmaster who enforces the tax as far as the genus canus is concerned, but instead of gathering in the taxless dogs by a gigantic butterfly net, as is the custom in the civilized parts of the world, they use a lasso with which they strangle the vagrant cerberus into submission and cast him then into a foul enclosure from whence he is condemned to asphyxiation, if his fond owner does not sally forth to the rescue. No doubt many of the owners for whom the Oakland architects are creating bungalows and "sich like," would gladly come to the rescue before the lethal chamber stage was reached, but we fear the shock to the system caused by the rough treatment and the strangulative lasso of the license collector.

The patriarchal fathers, when interviewed, informed a committee of architects that no tax had been levied on doctors or lawyers or dentists because they were governed by a State law which regulated the practice of their profession, and seemed very much surprised to know that the architectural profession was similarly controlled, but, like the Shah of Persia, they could not revoke what they had decreed, and the law, they said, must stand. They, however, gave the committee to understand that the carpenter-architect, to whom the drawing of plans was incidental to his business, and to whom it was not an exclusive method of earning a livelihood, would not be considered as taxable, so that the jerry-builder can roam at large without a leather collar with a brass tag thereon.

Another committee of child-like and innocent knights of the pencil salaamed before the City Attorney to get his opinion of the legality of the ordinance, but he was busy trying to find legal reasons why the citizens in the various wards couldn't vote on local option, and as the architect doesn't have a lot of stew-bums and hangers-on ready to vote as he dictates, he was given the overlook, while the saloon-keepers got the attorney's legal decision and the architects, like the fellaheen of Egypt, await with fear and trembling the dreaded coming of the hated tax-gatherer.

Another committee went to interview the Mayor, but the Mayor is of very ample waist proportions and the committee couldn't button-hole him, as the committee's arms were not long enough to reach over the capacious paunch of Oakland's Sancho Panzo—the committee, on account of the same plethoric stomach, was unable to get near enough to get the Mayor to hear them, and they also returned in sack-cloth and ashes from their fruitless mission.

It is said that the councilmen contemplate adding an amendment to the law requiring that the architects wear a leather muzzle during the hot months, and the amendment surely ought to pass, for if they are to be taxed the same as a stray cur, then the treatment should be parallel in all ways. The village

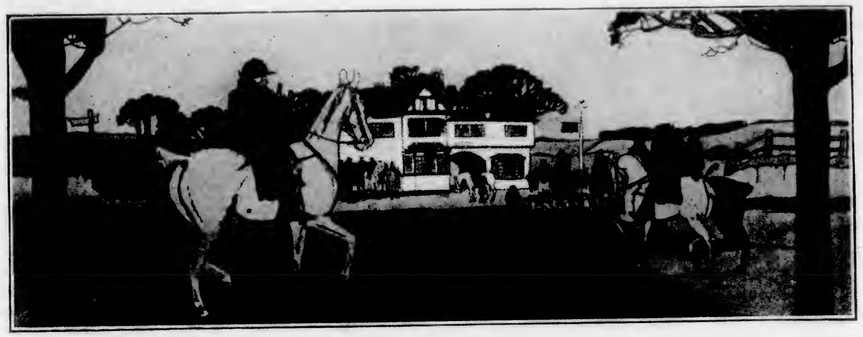
"Dogberrys" who passed this tomfool legislation gave out as their reason the fact (?) that the city needed the money. There are not over ten practicing architects having an office in the trans-bay sleepy hollow, and a city must indeed be poor that needs (?) two hundred a year so badly that it taxes its professional men for the privilege of earning their bread and butter.

The writer would recommend to the legislative gentlemen before referred to, that if the city of Oakland, which is generally supposed to be experiencing a boom, needs money so very badly, that they, the aforesaid legislators, levy a license tax of twenty dollars a year on nurse girls, as there are a great many more of them than there are architects, and the amount of revenue raised would be greater.

We are sorry for the great (to be) terminal city of the Western Pacific, and fear that this confession of poverty will not assist in the movement to effect a consolidation of all the east bay cities into one great metropolis, for Oakland's neighbor towns must surely look with suspicion on a city that **needs** two hundred dollars!

A. W. SMITH.

Treatment for Bedroom *L. Tozer and Son Co.* C-378



Interior Decoration Up-to-Date Furnishing

Dining-Rooms—Overdone and Underdone

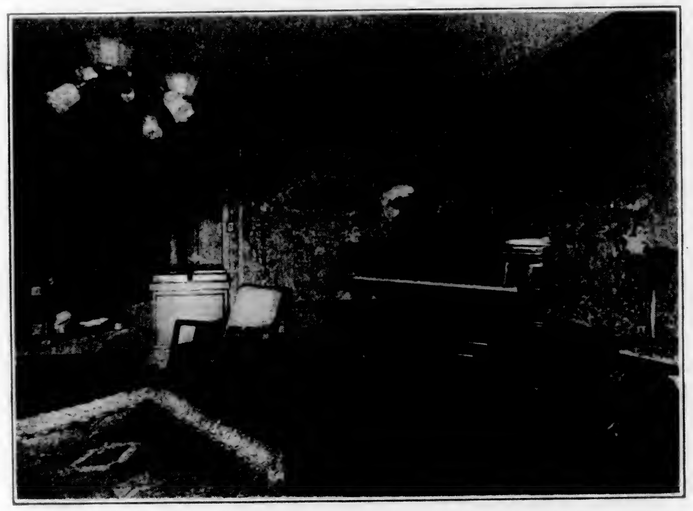
By C. WALTER TOZER

HOW often in attractive and pleasing homes do we find the dining-room the one element of discord in an otherwise harmonious and peaceful home. It has been said that "His dining-room is the touchstone of a man's refinement." This does not apply to its decoration alone, but the intimate philosophy which the architecture and decoration together express. There is an amiable quality of temperament that governs successful home decoration generally, and the dining-room in particular. Everybody wishes to express this philosophy without knowing it, perhaps without believing it,—that it is the keynote of a dining-room design. Even in dining-rooms which are distinctly banal and tawdy, we recognize what the owner wishes to express very well, only they had bad advice about it and did not express it.

Artificiality, stuffiness, tawdiness and lack of harmony was the result. The pretentious dining-room is naturally left to the decorator of experience and reputation, but every one has not the means to do this. Our article does not attempt to deal with this class of dining-rooms, but to the typical dining-room of mediocre city homes and suburban houses.

Period style of decoration for dining-rooms is all well enough when one has the money to expend in making the room correct in all its furnishings and decorations, but small means can not accomplish this except in a few simple styles, such as the Mission, Colonial, etc. Anything departing from the Anglo-Saxon dining-room is not to be recommended in America. The out-and-out American dining-room is the one that always commends our praise and the one we can at all times turn to with pleasure and gratification.

Treatment for Lower Hall by W. W. Tucker C-379



Living Room of a San Francisco Home
Wall Papers and Decorating by Llewelyn C-380

Simplicity, as a rule, can be utilized to produce a good room of any description, particularly a good dining-room. But the word "simplicity" is not always a safe word by itself for the successful decoration of a home, because there are a great many people who can not distinguish between good simplicity and that which is bad,—in fact, positively ugly.

For instance, a dining-room may be simple enough to suit any one, yet the room could not be called a pretty one. The window sills may be either unduly elevated or else unduly depressed, and the whole room devoid of features. There may be neither chimney nor fireplace; no cornice, no chair rail, no wainscot;—or, in a word, no especial character but simplicity. Thus we see that simplicity has a meaningless side which is worthless for art purposes. This same room could be made attractive by the use of a wainscot and cornice; the addition of a chimney and fireplace; and possibly the alteration of the window sills. The room would still have simplicity, but character as well.

One may be as original as they please in the making of their dining-room, but the originality must be confined within the iron-bound limits of precedent.

Freaks should be avoided, although sometimes they are in a way artistic successes. They often, however, produce a room which is not a dining-room.

On the other hand, one should not make his dining-room so strictly a dining-room as to appear a solecism were one to sit in it at other times than meal times. This is the "under-done way of it. One should have some of the living-room atmosphere about it,—some silent invitation to linger after the cloth has been removed, such a very homelike and comfortable all-around apartment, indeed, that one might wish to tarry at any time with his book or his writing materials.

Then you have your successful dining-room. Not over-done or under-done. There is now an increasing demand in California for what is called cretonne rooms. Rooms having the wall paper exactly matching the hangings have not been very plentiful on our Coast, but the demand for such is increasing very much at the present time.

What is prettier for a restful sleeping-room than a beautiful "all-over" floral pattern or a floral striped paper on the walls, with the window drapes, couch covering, and canopy bed covering all done with a cretonne just matching the wall paper?

The illustration shown represents an especially attractive room. The treatment is good for a city bedroom, where there is perhaps a scarcity of airiness as is conveyed by such a decorative scheme. It is also equally as fine on the other hand for a country house, which no doubt has the natural flower growth without.

Within the last few months a leading firm of decorators in San Francisco has been commissioned to decorate several rooms in this style, and the effects have been gratifying, both to the customer and the decorator.

Fabrics exactly matching wall papers are also found in other grades than cretonnes. There are silks, brocades, and tapestries having papers made to match them. These also work up well for sleeping-rooms and dining-rooms respectively. The papers having cretonnes to match are not necessarily expensive papers and a great many have the domestic cretonnes matching, making the cost of a cretonne room very nominal.

The papers range in price from twenty-five cents retail to a couple of dollars a roll, while the cretonnes can be had in domestic goods from twenty-five cents a yard upwards and the imported cretonnes from fifty cents up.

The coming season will no doubt see a great deal of this class of work done in both city and country homes.

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession :: :: ::

At the last examination of the California State Board of Architecture the following were granted certificates to practice: Robert Morganried, Henry H. Hedger, of San Francisco, and Thomas Beck, of Watsonville. The next examination will be held the latter part of April, and application should be filed with the secretary by April 20th.

While in the East last month Mr. Henry A. Schulze, president of the San Francisco Chapter A. I. of A. attended the annual convention of the American Institute of Architects in Washington, D. C. Mr. Schulze was much impressed by the general prosperity of the country, but from a building standpoint California is enjoying even greater activity than some of the larger Eastern centers.

A banquet at which various questions of interest to the profession will be discussed, will be held by the San Francisco Chapter A. I. of A. the latter part of March.

A joint meeting of the Northern and Southern Districts of the State Board of Architecture will be held in Los Angeles April 10th.

The Fairmount Hotel, Reid Bros., architects, is reported to have been purchased by Herbert E. Law and his brother, Dr. Law, in exchange for the Crossley and Rialto office buildings. There is talk of enlarging the building by the addition of two stories

An interesting contest was held by the San Francisco Architectural Club the past month for a cover design for The Architect and Engineer. The first choice was awarded to Mr. T. Bearwald draughtsman in the office of Sutton & Weeks. The design appears on the cover of this issue of the magazine. Second choice went to A. O. Johnson, of Meyers & Ward's office, and the third prize was awarded to A. R. Johnson, draughtsman in the office of Meyer & O'Brien.

❖ ❖

At the regular meeting of the Chapter of Southern California of the American Institute of Architects, February 13th, Mr. John P. Krempel reported on behalf of the committee appointed in the interest of procuring property for the chapter house, presenting a list of several available lots within the city limits. The chapter gave the committee full charge of the negotiations for the desired property.

A committee consisting of Octavius Morgan, John P. Krempel and F. D. Hudson, was appointed to receive subscriptions for the purchase of the property.

Building Reports

Bank building, Watsonville, Cal. Architect, J. Marquis, Santa Cruz. Cost, $20,000. Owner, Bank of Watsonville. The plans now being completed call for a two-story brick building, second story to be used for offices. Bank front to be of plate glass, marble and bronze.

Brick lodging house, north side of O'Farrell street, 80 feet west of Leavenworth street, San Francisco. Architects, Dodge & Dolliver, San Francisco. Owner, George S. Hill. Cost, $17,000. The structure will consist of four stories and basement.

The United Railroads Company will soon build a car house on the block fronting H street and Thirteenth avenue.

City Hall, Fresno. Architect, E. Matthewson, Fresno. Cost, $75,000. The contract for this building was to have been awarded two weeks ago, but it was discovered on the day that the bids were to be opened that the call for bids had to be advertised twenty days, instead of ten days, so the Council has voted to readvertise, and now all bids must be in by March 20, 1906.

Hotel, Santa Cruz. There are rumors of a $250,000 tourist hotel to be built in Santa Cruz this summer by a corporation of Eastern and California capitalists Mr. Van Cleek, of Santa Cruz, is one of the prime movers of the project.

Publishing House, San Francisco. Word has been received from the East that it has been decided to replace the present headquarters of the Methodist Book Concern on Market street with a new and substantial building to cost $75,000 or more. The concern purchased a site near the City Hall a year ago. The local committee which is to have charge of the new building includes Dr. F. D. Bovard, R. V. Watt and C. B. Perkins, all of San Francisco.

Business block, Sixteenth street and San Pablo avenue, Oakland. Owner, Dr. Kahn, of San Francisco. Cost, $35,000. Mention of the purchase of a site for this building was made in these reports some time ago. Plans are now being prepared, and they call for a four-story building, brick and stone, with stores on the ground floor and offices and apartments above. Dr. Kahn is a brother of Fred Kahn, the Oakland drygoods dealer.

Business block, Twenty-second and Market streets, Oakland. Owner, W. H. Watkinson. Cost, $20,000. The owner will build a three-story building with stores and apartments.

Residence, Bella Vista Park, Oakland. Architect, Julia Morgan. Owner, Dwight Huntley. Cost, $6,700. Building will be a frame affair and two stories. G. W. Flick has the contract.

Addition to Academy. It is reported that the Hoffmeyer Academy will spend $50,000 in new buildings to be erected in the Claremont district, near Berkeley.

Flats, Ninth and Grove streets, Oakland. Architect, A. W. Smith, Oakland. Cost, $7,000. Owner, George Schultze. Plans for four flats have just been finished and bids are now taken. The flats will contain four and five rooms each; colonial style; two stories; pine interior finish; concrete foundations; electricity.

Hotel, Shaw's Hot Springs, Nevada. Architect, C. W. Cook, Oakland. Cost, $100,000. Mr. Cook will be ready to take figures for the brick work, tile, heating and ventilating on this job in about six weeks.

Residence, East Oakland. Architect, C. W. Cook, Oakland. Cost, $3,500. Owner, B. H. Welch. The plans for this house have just been finished. It will be colonial style, two stories, concrete foundation, shingle roof, etc.

Post Office and store building, Monterey. Designers, T. H. Dean & Co., Monterey. Cost, $12,000. Owners, Monterey Mining Company. Plans have just been finished for a one-story building, to be Mission style, built of brick. Bids for this building will be taken March 1st.

Store and apartment building, Monterey. Architect, W. H. Weeks, Watsonville, Cal. Owner, Mr. Goldstein Cost, $35,000. The plans now being completed call for a three-story brick building with steel frame. Two upper stories to be used for apartments. This building will be modern in every respect with up-to-date fixtures and plumbing.

Masonic Building, San Jose. Cost, $50,000. It is reported that Architect H. F. Starbuck and Mr. Page, architect, San Jose, will prepare the plans for this new structure.

High School, Sonora, Cal. Architects, Stone & Smith, Flood Building, San Francisco. Cost, $20,000. Plans are being drawn for a one and one-half story brick and stone building. A feature of the structure will be a tin-covered dome. There will be considerable marble used.

Schoolhouse, Berkeley. Architects, Stone & Smith, San Francisco. Cost, $50,000. This is the building for which W. H. Wharff, architect, of Berkeley, was given the contract, but whose plans were afterwards rejected because they called for an expenditure of more than $50,000.

Clubhouse, Oakland. Cost, $5,000. Architect, W. H. Weilbye, Oakland. Owner, Alameda County Automobile Club. The house is to be built on the boulevard between Oakland and Haywards. For further information, see Mr. Weilbye, George S. Strong, Dr. Rodolph, or C. J. Hesseman, all of Oakland.

Tourist Hotel, Alameda. Architects, Cunningham & Politeo, San Francisco. Cost, $300,000. Owners, Syndicate in which the following are largely interested: E. A. Phelps, 1739 Central street, Alameda; George W. Scott, E. A. Phelps and W. E. Wettis, all of Alameda. The hotel is to be built at the corner of Union and Grand avenues.

School, Twenty-third and Fair Oakes, San Francisco. Architects, Martins & Coffey, Flood Building, San Francisco. Cost $25,000. Owner, Rev. P. R. Lynch, San Francisco. The same firm has plans for two-story frame flats to be built on Fillmore street for Andrew J. Clunie at a cost of $17,000.

Los Angeles (special). The following new work is being turned out in the office of Architect A. F. Rosenheim, Hellman Bldg., Los Angeles. Residence Arlington avenue, in Winchester place. Owner, John Houge, Esq. Cost, $25,000, including garage. Fourteen rooms, hardwood finish, sanitary plumbing, tile roof; all modern conveniences. Contract for general work let to F. O. Engstrom Co.

Residence, Ocean and Montana avenues, Santa Monica. Owner, D. A. Hamburger, Esq. Stable and garage will also be built. House has fourteen rooms; Mission style; cement plaster exterior; tile roof; hardwood finish; sanitary plumbing, etc.; modern in every respect. Cost, $20,000.

Residence, Rampart Heights. Owner, Frank R. Strong, Esq. Cost, $18,000. Plans are in preparation for a twelve-room residence, stone first story, siding second story; tile roof; hardwood finish; all up-to-date conveniences.

Alterations to building at northwest corner Fourth and Spring streets. Also fixtures, fittings and decorations of store rooms for The United Cigar Stores Company. Contracts to be let this week.

Six-story, reinforced concrete building, Broadway, between Fourth and Fifth streets, Los Angeles. Architects, Morgan & Walls, Los Angeles. Owners, The Bumiller Estate. Plans are now in preparation.

New Civic Center Building, Market and Van Ness avenue, San Francisco. Cost, $150,000. Architects, Meyers & Ward. Owner, White Sewing Machine Company. Reference to this building has already been made in these reports Contract for the foundation has been let. Building will be four stories, built of brick and terra cotta; stores and loft; felt and gravel roof; elevator.

Fireproof building, Ninth and Mission streets, San Francisco. Owner, James Conlon, San Francisco. Cost, $60,000. Mr Conlon has recently bought the property on the Easterly line of Ninth street, north from Minna, and plans will be prepared at once for a five or six-story brick fireproof building.

Alterations to State Capitol, Sacramento. Architects, Sutton & Weeks. Plans and specifications for the various improvements and additions to the State Capitol are finished and contractors can see the plans at Sutton & Weeks's office, 510 Montgomery street, San Francisco. Bids must be in by March 15th. The total cost of the improvements will run close to $1,500,000. All contracts are to be let separately.

THE
Architect and Engineer
OF CALIFORNIA

Published Monthly in the interests of the Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast by the Architect and Engineer Company.

SAN FRANCISCO AND LOS ANGELES

Terms of Subscription $1.00 per year.

Offices—215 Sansome Street, San Francisco; Telephone Davis 945.
142 Broadway, Los Angeles; Telephone Home 5747.

Press of THE HICKS-JUDD COMPANY, 21-23 First Street. *Halftones and Etchings by* CALIFORNIA PHOTO ENGRAVING COMPANY, First and Mission Streets, S. F.

Vol. IV. MARCH, 1906 No. 2

EDITORIAL

AN UNSATISFACTORY ORDINANCE

The San Francisco Supervisors again have shown poor judgment in passing to print an ordinance which provides a general plan for the construction of all public buildings erected in the city. The measure provides, among other things, that the architect whose plans are accepted immediately becomes the consulting architect for the work. It then calls for the appointment of a supervising architect by the Board of Public Works, who shall be put in full charge of the construction of new buildings.

It is hardly to be expected that our best architects will care to prepare plans for a public building under such an ordinance. A supervising architect would, of course, come directly under the control and dictation of the Board of Public Works. The board, if it chose, could boss the supervising architect, and the latter, in turn, could boss the consulting architect or the man who drew the plans. We doubt if the average reputable architect would care to thus lower his professional dignity by being called upon to follow the dictates of some one perhaps less competent than himself.

A still more unsatisfactory feature of the new ordinance is the section providing compensation for the consulting and supervising architects. To quote:

"The consulting architects shall receive three (3) per cent of the cost of the building for which he shall have been appointed such consulting architect, and the general supervising architect two (2) per cent of such cost, where the cost of such building shall be $100,000 or less. Where the cost of such building shall be over $100,000, the consulting architect and the general supervising architect shall each receive two and one-half (2½) per cent of such cost. The payments herein provided for shall be in full and complete payment of all services rendered by such architects in anywise in or about the plans or construction of such buildings."

Again we seriously question whether our best architects would care to seek this public work when the compensation is only about half of the commission he gets for general work. Just why the city should not be willing to pay as much as the private builder to get the maximum of good results is not quite clear. The ordinance ought to be repealed.

❖ ❖

GLASS HOUSES ARE COMING

The prospects are that the time is not far distant when people who live in glass houses may throw all the stones they care to without fear of consequences to their own domiciles, as there are strong indications that the glass house may be a reality before many years have rolled by. It is a possibility now, but would be rather expensive. Glass paving bricks have been successfully used. Hollow glass house bricks are made; glass foundations are more durable than stone; and there is glass roofing, glass gas pipes, glass kitchen and bathroom equipments, and glass furniture.

❖ ❖

COMPETITIONS

Owing to the smallness of commissions and the great expense of maintaining an office, architects should take the matter of competitions under very serious consideration. The cost of maintaining an architect's office has increased materially in the past few years—rents are higher, draughtsmen demand better wages, better results in beauty and practicability require more time for study, and yet the fees are no greater than they were several years ago. This being an established fact, the question of adding to these expenses by entering competitions is of vital interest to all members of the profession.

Competitions waste money. If the non-successful competitors are not paid, they lose. If they are paid, the client is paying for something that he does not get.

Despite these facts, it was the concensus of opinion of the Institute of Architects, as expressed at their last meeting held recently in Washington, that competitions are a necessary evil, but which, when held, should be under circumstances as mitigating as possible.

That they are an evil is proven by the experience of such well-known architects as Mr. Cass Gilbert, Mr. George B. Post, Mr. John M. Carrier and Mr. Andrews, etc. Their experience has been that competitions require an expenditure greatly in excess of the recompense—Mr. Carrier stating that he had lost thirty-five out of forty; that the client rewards the successful competitor on his ability as a draughtsman, not as an architect. This is demonstrated by the well-known fact that competition drawings are never built until they are re-drawn out of all recognition.

Competitions are necessitated by the lack of unity among the architects. This is not to be wondered at when "architect" in the United States means anything from a carpenter to a landscape gardener.

The mitigating circumstances are well covered by Mr. W. B. Mundie in his address before the Institute, as follows:

The American Institute of Architects recommends that, wherever possible an architect be employed without a competition. When a competition is deemed necessary, the procedure must be in accordance with the following code.

Form of Competition.—(A) The competition must be limited to a certain number of architects, each of whom is invited to take part.

(B) Each competitor to receive a certain sum of money to reimburse him for the expense incurred, this sum to be agreed upon between competitors and prospective client, and this sum to be paid to each competitor other than the one awarded the commission, or a prize, as prizes are agreed upon.

(C) The author of the design receiving the first mention by the jury must be employed to design and superintend the erection of the building.

Jury of Award.—The jury of award must consist of not less than three members and a majority of the jury must be members in good standing in the American Institute of Architects, and the entire jury of award is to be agreed upon between competitors and prospective client.

Programme.—The programme must be drawn so as to form a contract and be signed by all competitors and by the prospective client.

Rules of Conduct.—(A) All designs must be signed by the name of the competitors submitting designs.

(B) No member of the American Institute of Architects shall enter a second competition for the same building unless he was a competitor in the first competition.

(C) No change or deviation from this code shall be permissible until such change shall receive the sanction of the executive committee of the Institute.

(D) It shall be deemed unprofessional for any member of the American Institute to violate any of the provisions of this code.

(E) It shall be deemed unprofessional for any member of the American Institute to enter any competition based upon this code with any competitor who has once been censured for unprofessional conduct in competitions conducted under this code.

Remember that the members of the Institute are not to be governed by the actions of the Institute. It is purely a dice-box, black-and-red game, and not a gentleman's game. We do not say you shall never have competition. We say that "Wherever possible, an architect be employed without a competition." An owner does not want that.

"The competition must be limited to a certain number of architects, each of whom is invited to take part." A possible criticism of that is that a young man would never get a chance. But what he has to do is to wait a little longer. If he has it in him, he will get his chance. There is room at the top.

"Each competitor to receive a certain sum of money to reimburse him for the expense incurred, this sum to be agreed upon between competitors and prospective client, and this sum to be paid to each competitor other than the one awarded the commission, or a prize." That brings it down to a business basis. "The author of the design receiving the first mention by the jury must be employed to design and superintend the erection of the building." Any owner who will not agree to that has a sinister motive for wanting a competition.

"The jury of award must consist of not less than three members and a majority of the jury must be members in good standing in the American Institute of Architects, and the entire jury of award to be agreed upon between competitors and prospective client." No one will differ from that.

"The programme must be drawn so as to form a contract and be signed by all competitors and prospective clients"—that from a business standpoint nobody could object to.

"All designs must be signed by the name of the competitors submitting designs." You may say Why, then, they will know who the competitors are. Certainly. Why should they not? It is an insult to an intelligent juror on the face of it, for it implies that they would have favor for their friends. At the Carnegie Institute, for example, the pictures are signed and the jury are mainly artists, but no one thinks that the jury are swayed by the knowledge of who the competitors are.

"No member of the American Institute of Architects shall enter a second competition for the same building unless he was a competitor in the first competition." That will prohibit the annuling of the competition where an award is made to someone whom the owner does not favor. He is then put into a position of picking the man. An owner under this code organizes the competition; if he is not satisfied, he can pick his man.

The rest of this is purely on unprofessional conduct. We have to arrange our laws so that the cure will apply and apply quickly, and not appear in the convention poceedings two years afterwards when nobody knows anything about it.

If competitions must be held, let it be under the above conditions, but it would be well for the architect and the client if they could realize that competitions only show the architect's skill and do not solve the problem; that the architect's skill is much better shown by his work than by his drawings, and that they are both undergoing a useless expense.

CHARLES PETER WEEKS.

❖ ❖

TEST FOR DRAUGHTSMAN.

The United States Civil Service Commission announces an examination on March 21-22, 1906, at the places mentioned in the accompanying list, to secure eligibles from which to make certification to fill vacancies as they may occur in the position of topographic draftsman in the Post-Office Department, at $900 per annum.

As the Commission has experienced considerable difficulty in securing eligibles for this position, none having been secured as the result of the examination held on January 3-4, qualified persons are urged to enter this examination.

❖ ❖

"House Hints for Those Who Build, Buy, Improve or Rent," is the title of a very interesting book, by Architect C. E. Schermerhorn of Philadelphia. It is a practical treatise descriptive of every essential detail pertaining to site, location, arrangements, construction, plastering, heating, plumbing, lighting, decorating and furnishing of the house and should prove a valuable help to the house-builder. Address House Hints Publishing Company, Philadelphia.

❖ ❖

THE MAN WORTH WHILE.

It's easy enough to be pleasant
When life flows along like a song,
But the man worth while
Is the one who can smile
When everything goes dead wrong.
—Exchange.

The Publisher's Corner

THESE MEN OWN THEIR JOBS.

In these days of trusts and combinations of great aggregation of wealth, and autocratic industrial power in the hands of a few, it is actually refreshing to happen upon a manufacturing enterprise proceeding in the opposite direction.

The above picture shows a group of mechanics who legally and actually "own their own jobs." Instead of being dictated to by a boss, they themselves elect a manager, and his policy conforms to their ideas and wishes.

Such a plan is a startling innovation to the average business man. It will also sound strange to many professional men. We are accustomed to the prevailing industrial methods where the proprietor or manager decides all important matters and issues orders to subordinates. It is not often that we see in America a successful co-operative manufacturing enterprise. It is indeed quite surprising to find one in a comparatively new part of the world, where opportunities for individual effort are supposed to abound.

The group in the picture is a part of the stockholders of the Inlaid Floor Company, organized at San Francisco in 1897. There were but five at the beginning, and the combined capital of them all was less than $2,000. But by their skill and industry and honorable dealing these five won the respect and confidence of the building trade and the appreciation of every patron. As the field enlarged new members were gradually added to the list of stockholders from among the employees of the company, until now the investment is over $35,000.

No stock has been sold by the company to any one not actively engaged in the business, and none has ever been offered to any one but an employee who has by service demonstrated his fitness as a mechanic to take his place on an equality with the others. No one is sold more than a limited amount of stock, that the original idea of equality shall be preserved.

To-day the Inlaid Floor Company, owning a well-equipped factory free from incumbrance, with offices at Portland and Seattle, stands as an example of what workingmen can do in the business world.

Since 1897 the standard of work maintained at San Francisco and surrounding cities in the hardwood floor line by the Inlaid Floor Company is not excelled anywhere in the United States. It is doubtful whether its record has ever been equaled anywhere. And

during this period the prices of hardwood floor work at San Francisco have been no more and even less than is obtained for the same work on the Atlantic seaboard.

The secret of this uniform success, financially, as well as the well-earned reputation of the Inlaid Floor Company, lies in its co-operative make up. Previous to its formation every one who engaged in this line of business at San Francisco failed to make it successful. It is probably within the truth also to say that no where else in the United States has any individual enterprise in the same line of business during the same period equaled the record of this co-operative venture of working men.

Direct dealing from the mechanic, the manufacturer in fact to the actual consumer, the elimination of highly paid officers, and the modest expectations of the promoters, have all contributed to the success of this company. But probably the greatest source of the company's progress has been its bringing into direct contact with patrons an actual member of the firm competent to execute the work desired and careful to promote the common interest.

The original incorporators have ambitious plans to organize under their banner branches in other large cities. They keep open the door of opportunity to all who are regularly employed to join them, and hope thus to aid other workingmen in the march of labor to better conditions.

The manager of the company believes in the "spirit of service," as he calls it, as the happier philosophy of life. His idea of serving his fellow man best is to see to it that they actually and legally "own their jobs."

It is difficult to see how such an institution can fail to have satisfactory results to both the mechanic and the consumer. The mechanics are selected by men of their own trade who know who are the fittest. The good workmen who are steady are all given an opportunity, after sufficient time of service, to become part owners in the industry on equal terms with the original promoters.

The patrons of the Inlaid Floor Company can thus rely upon having the attention of responsible and first-class workmen. That the co-operative plan has been a success from the consumers' standpoint is manifested more clearly by the many letters of commendation which have voluntarily been sent to the manager and by the further fact that the Inlaid Floor Company has a most excellent reputation among the architects and builders, and references galore in and out of town among those owning fine residences.

❖ ❖

Ten years ago Mr. J. H. Burnett commenced his career in Fresno as foreman of a small iron foundry. By earnest effort and constant industry he has built himself up until he now owns one of the largest and best equipped plants in the San Joaquin Valley. The enterprise is known as the J. H. Burnett Iron Works. It employs an average of twenty men the year around, pays out a small fortune in wages annually and makes a fine line of work from steel, iron and cast iron. It has done so well that it is soon to be enlarged with a new foundry, having two cupolas and a large traveling crane.

Mr. Burnett manufactures architectural and structural steel, including ornamental iron works of all kinds. He will also undertake work in wrought and cast iron, and all kinds of castings are made to order.

Structural and machine castings are a specialty in his works. In fact, this is a well-equipped iron plant, having facilities to handle promptly any kind of orders in the lines mentioned, or that may be called for.

It is entirely reasonable and probable that in the near future Mr. Burnett will maintain at Fresno one of the largest and most prosperous plants on the Pacific Coast.

He has been a valuable citizen of Fresno county for twenty-seven years.

❖ ❖

The cement or concrete fence post is receiving more attention now than ever before. In an interview T. A. McMurtrie of Los Angeles expressed his views on the concrete post as follows:

"I believe there is room for improvement in the construction of concrete posts as manufactured at present. The solid post, if made the usual size of fence posts, would be heavy and apt to lean over in soft ground. I notice some manufacturers of concrete fence posts recommend the use of twisted wire or gas pipe for reinforcement. I have been making some experiments along this line at our works in Los Angeles. The solid post I reinforced with ¾-inch gas pipe the full length of the post. The hollow post I reinforced with four strips of galvanized iron ¾ of an inch in width, placing one near each corner of the post, both being 6x6 inches at the lower end and 3x3 inches at the top. The hole in the hollow post was 3x3 inches at the lower end and 1x1 inch near the top.

"My experiments have demonstrated the superiority of the hollow post. I have noticed some tests made of fence posts by dropping a heavy weight upon the post a sufficient distance to break the post, then testing a wooden post of the same size in a like manner.

"This I do not regard as a fair test of the concrete post, the density of the two materials being widely different. A better and a fairer test would be to place a gradual strain, such as would be required in a fence. The hollow concrete fence post can be made at a cost that would compare very favorably with a good wooden post. One important thing in manufacture of artificial stone, particularly a long piece, such as a fence post, is that it should be made on a smooth level floor or on a straight thick plank. Remove the mold or form from the fence post and allow it to remain undisturbed until thoroughly hardened. This will avoid cracking, as would necessarily occur in handling or moving the newly made product. Thorough mixing and tamping of the material into the forms is, of course, of great importance."

One of the latest artificial building blocks to be turned out has recently been placed on the market by Reed & Kimball, of Antioch. It is known as the Economy Artificial Building Stone, and has six complete surfaces and a perfect bond between each. It has a hard, durable surface, and can be made in any form or color. The surface of this block is furnished with any required design of contour or coloring, to suit the parties interested in the structure to be erected. The bearing surfaces, top and bottom, are complete, giving full and perfect (as though wholly solid) support to the next course of blocks above each tier. The interior of the block is a system of cylindrical arches which are as capable to support the overlaying weight as the same volume of the original composite. By this means we can give, to illustrate, any block being of a solid and having a tensile value of 18,000 pounds to the square inch; the same tensile value and same carrying surface for less than one-half the material; that is, to wit: A block 18x16x14—4,032 cubic inches of solid granite, marble or concrete; Economy artificial stone has the same tensile value for 1698-45.100 cubic inches of material used.

Kimball & Reed would be glad to furnish estimates on the cost of any kind of artificial stone work, and any communications to the firm should be addressed to Antioch, Cal.

To the Pacific Stone Company, Crossley Building, this city, has been awarded the contract for furnishing the material chosen for the facing of the exterior of the basement walls of the Fairmount Hotel. This material is a manufactured concrete stone, made under the Stevens patents, and known to the trade in the East as Litholite or Roman Stone. It is a poured concrete cast stone, composed of materials selected for qualities that make it a very valuable and a very beautiful building material. It is made in any form and dimension required by architects, and in various finishes. The Roman Stone for the above work at the Fairmount Hotel is to have a granite finish to match the natural granite of the first story of Mrs. Oelrich's beautiful building.

The Pacific Stone Company has also secured the contract, and will at once begin the construction of a factory building at Black Diamond, Contra Costa County, for the Redwood Manufacturers' Company, which latter company is increasing the size and capacity of its already immense plant at that point. The new building will be constructed of concrete stone, on the "hollow block" plan, and will be 200 feet long by 80 feet wide. The features of strength, durability, fire resistance and economy of construction decided by the Redwood Manufacturers' Company in its choice of the material offered by the Pacific Stone Company, and the selection is but another indication of the great favor into which concrete construction, in all its forms, is growing on the Pacific Coast.

A good example of the modern concrete block building is found in the Oluf Warehouse, just completed in Fresno. The building is owned by Mr. O. B. Olufs, who is secretary and one of the owners of the Valley Artificial Stone and Cement Works, whose blocks were used in the construction of the warehouse.

The building covers 14,000 square feet, and is absolutely fire-proof, having a cement floor and a concrete vault with accommodations for an immense quantity of goods. Not only is the warehouse fireproof, but it is very nearly cold storage. There are ten entrances. It took 3,500 building blocks to complete the structure. It was built and designed by the owner at a cost of $6,000. It is probably the most substantial warehouse of the kind in the West. It is within easy reach of the business center of Fresno and close to the Santa Fe railroad tracks.

The works of the Valley Stone Company are close by, and a good sized force of men is kept busy most of the time turning out material for a growing industry.

❖ ❖

THE BUILDING OF A CITY BEAUTIFUL.

A unique experiment, the creation of an ideal residence section, is being undertaken in Claremont, Berkeley's most desirable suburb. Claremont was chosen as the seat of this enterprise because of its proximity to the State's great institution of learning, its fog-and-wind-free climate, its short distance in point of time from both San Francisco and Oakland, and the natural loveliness of its rolling hills and oakshaded canyons.

In order that it might absolutely control the character of a definite section, the Claremont Park Company has there purchased nearly two hundred and fifty acres of land. Famous architects and landscape gardeners were called in to create a comprehensive scheme of improvement. Under their direction wide avenues have been laid out, large areas parked, street trees planted, sewer, water and gas systems installed and massive stone gateways and bridges built.

Following this development work the organizers of the Claremont Park Company set to work upon a hotel enterprise, and have only recently selected the plans of C. W. Dickey, of Oakland, which involve an expenditure of nearly $300,000. They have also made arrangement for the extension of the Key Route service to the entrance of their property, which brings it within thirty-five minutes of the San Francisco ferries.

Wise building restrictions guard against the erection of undesirable houses and flats. Apartment houses and business of every kind are barred. When the work of development is completed, Claremont will merit more than any other residence section "The City Beautiful."

Fred Jurgewitz, whose advertisement will be found in this number of The Architect and Engineer, is fast gaining an enviable reputation in the manufacture of staff and stucco work and plaster ornaments for both interior and exterior decoration. His plant at No. 1017 East Sixteenth street, East Oakland, is one of the most complete of its kind on the Coast. Mr. Jurgewitz carries in stock a large number of new and original designs in plaster ornaments. For those wishing their material made to order ample facilities are at hand for filling the order, no matter how portentous it may be. The plaster ornaments include mantles, ceilings, cornices, centerpieces, mouldings, brackets, gables, friezes, carved panels and capitals.

Mr. Jurgewitz has spent ten years in this line of business, and in that time some of the largest and costliest buildings in Alameda County have been beautified with work from his studio. Mr. Jurgewitz's reputation, in fact, extends outside of Alameda County, San Francisco and other large cities in the state sharing with Oakland the fruits of this well-known artist's efforts. Some of Mr. Jurgewitz's work in which he takes more than common pride is the exterior of Mr. J. R. Glascock's residence at the corner of Walworths and Monte Vista avenue, the Hodge Building at the corner of Fairview and Adeline streets, Lorin, and the entrance of the Park Theatre, in Alameda.

Advertisers will be gratified to know where you saw their ad.

Advertisers will be gratified to know where you saw their ad.

One of the finest electrical salesrooms in the State outside of San Francisco can be seen in Monterey at the Globe Electrical Company, 232 Alvarado street. The company recently moved because of an increase in its business, and in fitting up its new salesroom spared no expense. This has been decorated and fitted under the direction of Mr. W. H. McConnell, the manager and president of the company.

The stock of electrical supplies carried by the Globe Electrical Company is as complete as can be found anywhere in the State, and the prices offered are as low. With these conditions in the trade in Monterey there is no reason for outsiders to go abroad to purchase their furnishings.

The firm carries everything in the electric line from a doorbell to a dynamo, and is prepared to give figures on all kinds of electrical work.

The Redwood Manufacturers' Company of Oakland announce in this number that they have in stock at the present time an exceptionally large number of handsome panel doors in pine and redwood. This company is making a specialty of doors and windows, as well as outside and inside finish and millwork in either redwood or pine. The company's lumber yard is at Black Diamond and is one of the largest in the world. Mr. W. A. Boscow is the popular manager of the Oakland office, to whom all communications should be addressed.

Heating water quickly and cheaply for household purposes has long been and may long continue to be a vexing problem to the inventor. The Roberts heater, a cut of which appears on page 16 of this magazine, represents a long stride on the road to perfection in that line.

In this heater are combined a number of the features generally sought by builders, viz: Simplicity of construction, safety from explosion and effectiveness in heating water. The main feature of the heater consists of a hollow cast iron disc placed under an ordinary stock boiler and over a strong Bunson flame. The water passes down from the center of the boiler into the disc, over and around the flame, out at the side and through a pipe up the outside of the boiler to the top, so as to allow free and continuous circulation. The boiler and flame are enclosed in a double asbestos lined, Russia iron casing.

In the Roberts heater the water is given the greatest heating surface practicable in a heater which can be sold at a reasonable price. The circulation of the water, though free, is not so rapid that it interferes with thorough heating.

This machine is making a favorable impression and is well worth investigating.

The Architect and Engineer
Of California

Issued monthly in the interests of the Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast.

Terms of subscription, $1.00 per year.

Single Copies, Fifteen Cents.

Offices { 215 Sansome Street, San Francisco, Cal., Telephone Davis 945.
142 S. Broadway, Los Angeles, Telephone Home 5747.

Contents for April

HON. JAMES D. PHELAN

THE
ARCHITECT AND ENGINEER
OF CALIFORNIA

VOL. IV. APRIL, 1906. No. 3.

San Francisco—An Historical Sketch

By JAMES D. PHELAN

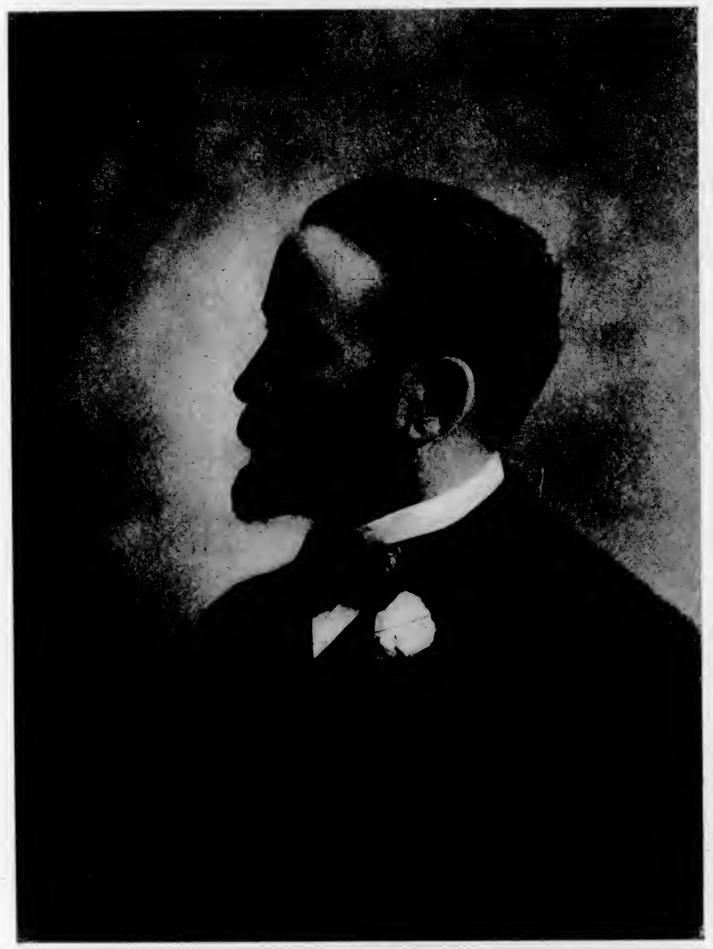
Former Mayor James D. Phelan has written an extremely interesting historical sketch of San Francisco for publication in the official report of the D. H. Burnham plan. Advance sheets of Mr. Phelan's report were furnished this magazine and they are published herewith, together with a few pertinent illustrations of San Francisco—past and present, generously loaned by the publisher of the Merchants' Association Review. Mr. Phelan is president of the Association for the Improvement and Adornment of San Francisco. It is the fond hope of the former mayor that he live to see realized, at least a fair beginning of this splendid enterprise.

SAN FRANCISCO has been greatly praised for the beauty of its situation, but apart from that, its site was a wind swept and sandy peninsula, and it required much labor, not always well directed, to make it a habitable place. James Bryce in his "American Commonwealth," written in 1889, says: "Few cities in the world can vie with San Francisco either in the beauty or in the natural advantages of her situation; indeed there are only two places in Europe—Constantinople and Gibraltar—that combine an equally perfect landscape with what may be called an equally imperial position;" but Don Pedro de Alberni reporting, in July, 1796, to the Viceroy of Spain, states that there is little wood on the peninsula of San Francisco; no water nor arable lands, and that, therefore, in his opinion it is the "worst place or situation in California for the establishment of such a villa as is proposed by the Senor Contador, Don Jose M. Beltram." (Dwinell's Colonial History, Addenda p. 18.)

The location of cities is not determined, however, by selection so much as by events. Yerba Buena, the original name of the port of San Francisco, was located in a sheltered cove, between Telegraph and Rincon Hills, with deep water off shore, convenient to the Golden Gate, or narrow entrance from the sea; but the only back country was the stretch of land between the ocean and the bay extending southerly into Santa Clara Valley.

It can be well understood how many pioneer settlers, among them General W. T. Sherman and Thomas O. Larkin, United States Consul at Monterey, believed that the principal city on San Francisco bay would spring up at the head waters of navigation near the confluence of the great rivers of the Sacramento and San Joaquin which debouch into the bay at or near Benicia. Back of Benicia was the richest mining country, and river navigation was the familiar means of transportation.

But Benicia, auspiciously begun, has made no progress in half a century and is still a mere village, while San Francisco is a world city of commanding importance—the chief port of the United States on the greatest of the world's oceans.



HON. JAMES D. PHELAN

THE
ARCHITECT AND ENGINEER
OF CALIFORNIA

VOL. IV. APRIL, 1906. No. 3.

San Francisco—An Historical Sketch

By JAMES D. PHELAN

Former Mayor James D. Phelan has written an extremely interesting historical sketch of San Francisco for publication in the official report of the D. H. Burnham plan. Advance sheets of Mr Phelan's report were furnished this magazine and they are published herewith, together with a few pertinent illustrations of San Francisco—past and present, generously loaned by the publisher of the Merchants' Association Review. Mr. Phelan is president of the Association for the Improvement and Adornment of San Francisco. It is the fond hope of the former mayor that he live to see realized, at least a fair beginning of this splendid enterprise.

SAN FRANCISCO has been greatly praised for the beauty of its situation, but apart from that, its site was a wind swept and sandy peninsula, and it required much labor, not always well directed, to make it a habitable place. James Bryce in his "American Commonwealth," written in 1889, says: "Few cities in the world can vie with San Francisco either in the beauty or in the natural advantages of her situation; indeed there are only two places in Europe—Constantinople and Gibraltar—that combine an equally perfect landscape with what may be called an equally imperial position;" but Don Pedro de Alberni reporting, in July, 1796, to the Viceroy of Spain, states that there is little wood on the peninsula of San Francisco, no water nor arable lands, and that, therefore, in his opinion it is the "worst place or situation in California for the establishment of such a villa as is proposed by the Senor Contador, Don Jose M. Beltram." (Dwinell's Colonial History. Addenda p. 18.)

The location of cities is not determined, however, by selection so much as by events. Yerba Buena, the original name of the port of San Francisco, was located in a sheltered cove, between Telegraph and Rincon Hills, with deep water off shore, convenient to the Golden Gate, or narrow entrance from the sea; but the only back country was the stretch of land between the ocean and the bay extending southerly into Santa Clara Valley.

It can be well understood how many pioneer settlers, among them General W. T. Sherman and Thomas O. Larkin, United States Consul at Monterey, believed that the principal city on San Francisco bay would spring up at the head waters of navigation near the confluence of the great rivers of the Sacramento and San Joaquin which debouch into the bay at or near Benicia. Back of Benicia was the richest mining country, and river navigation was the familiar means of transportation.

But Benicia, auspiciously begun, has made no progress in half a century and is still a mere village, while San Francisco is a world city of commanding importance—the chief port of the United States on the greatest of the world's oceans.

Why the one was preferred over the other shall never be known—sufficient to say, San Francisco found favor in the eyes of the men of commerce and trade before the days of railroads; had, however, the western railroads been under way at that period (they did not come until 1867) there might have been a different story to narrate, for San Francisco, for the most part, is accessible to transcontinental lines from the mainland shore of the bay only by means of ferries—usually an impediment to traffic. But some cities, predestined to greatness, overcome all impediments and so prove their necessity and fitness.

General Sherman tells in his Memoirs (p. 55) how Dr. Semple and others, in 1847, believed that the great city of the Bay of San Francisco would rise on Carquinez Straits; how General Vallejo gave them title to a league of land on condition that the city should bear the name of Vallejo's wife, Francisca; how, soon after the name of Yerba Buena was changed to the City of San Francisco, by Alcalde Bartlett, in order to checkmate the founders of Francisca, thus forcing them to rename their town site, Benicia, the second baptismal name of the Senora Vallejo. Now, this is what General Sherman says: "I am convinced that this little circumstance was big with consequences. That Benicia was the best natural site for a commercial city I am satisfied; and had half the money and half the labor since bestowed on San Francisco been expended at Benicia, we should have at this day a city of palaces on the Carquinez Straits. The name of 'San Francisco' fixed the city where it now is, for every ship in 1848-49, which cleared from any part of the world, knew the name of San Francisco not Yerba Buena or Benicia, and consequently ships consigned to California came pouring in with their contents and were anchored in front of Yerba Buena, the first town."

General Sherman understood surveying and might have attained the first rank as a "builder of cities" if his "bump of location" were more pronounced. He confesses to surveying Colonel J. D. Stevenson's newly projected city "New York of the Pacific," situated at the mouth of the San Joaquin river, for which he received $500, and ten or fifteen lots, enough of which he sold to make up another $500, and abandoned the balance. This city met the fate of numberless other projects about the bay. (Memoirs p. 74.)

There must be some magnet in the site of San Francisco. As Bret Harte sang of the metropolis:

> "Thou drawest all things small or great,
> To thee beside the western gate."

San Francisco (when R. H. Dana, Jr., looked upon it in 1835) was a hilly and barren waste. The pioneer in city building had something to subdue. By him the sand dunes were dumped into the cove below Battery and Market and Montgomery and Washington streets, making a new shore line, reclaiming many acres of land from the bay and giving deep water for the wharves; but the conspicuous fault of the men at that time was perhaps a lack of esthetic sense, for instead of circling the hills with roads, rectangular blocks were laid out on their slopes. Furthermore, the city suffered from the confusion arising out of land litigation. When California was ceded by Mexico to the United States, existing property rights had to be respected, but these rights were hard to determine. It was the practice of Spain to settle its Pacific colonies by the establishment of missions, representing the religious branch; presidios, the military authority, and pueblos, (limited to four square leagues) the town or civil government. The pueblo lands of the city were sacred, and it has been decided that they were "held in trust for the inhabitants," so after squatters and judgment creditors against the city had taken

possession of much public property, they were finally compelled to compromise their alleged claims by the assertion of the city's pueblo rights. (Harte vs. Burnett, 15 Cal. reports; U. S. Supreme Court, Townsend vs. Greely, 1866.) In 1856 and in 1865 the city was given the "Van Ness Ordinance" and other municipal enactments by which the public parks, places, school and fire lots and streets were finally confirmed to the people out of the public domain. But first, what is the history of Spanish and Mexican dominion?

After conferring plenary powers on viceroys and "presidents of my royal audiences" to sell uncultivated lands, the Spanish King, in 1754, added this wholesome and provident restriction, to which is due the little that the city inherited in the way of public lands: "But in regard to lands of community, and those granted to towns for pasturage and commons, no change shall be made; the towns shall still be maintained in possession of them." (Wheeler's Land Titles, p. 4.) They were inalienable. (Ibid.) By the laws of the Indies it appears that Spain was wise and liberal in its policy respecting the founding and planning of towns. "The viceroys and governors, being thereto authorized, shall lay out for each town or village the lands and lots which they may want." * * * "As the mission settlements are hereafter to become cities, care should be taken in their foundation that the houses be built in line with wide streets and good market squares, etc." Power was granted to commandants to designate common lands. (Ibid.)

After the acquisition of California by Mexico in 1821, the ayuntamiento, (the council which Spain set up in its municipalities) was authorized by the Territorial Assembly to grant lots 200 varas back from the beach, a restriction designed to save the harbor front for the common benefit.

Jacob P. Lesse, who left Los Angeles for better commercial prospects in San Francisco, built in 1836 the first house erected by an American on the west line of the present Dupont street. An Englishman, W. A. Richardson, however, had preceded him by one year, but had built a mere shanty. The cove of Yerba Buena had not at that time been surveyed but was used as a landing place by ships trading in grain, hides and tallow—20,000 hides and 2,000,000 pounds of tallow having been exported in one year. Exclusive of the Indians, there were but sixty persons living at the Mission (founded October 9, 1776) and fifteen soldiers at the Presidio.

This Mission was called San Francisco de Assis, or, sometimes, de Dolores. The Mission fathers of the Franciscan order, who gave the name of San Francisco to the bay in 1769, which they had discovered from the land, and to which they believed they were led by the patron of their order, St. Francis, converted the native Indians to Christianity. The Indian population in 1802, according to the authority of Humboldt was, male and female, 814. They were as low as any known race in the scale of humanity, but they were patiently taught useful arts. The Mission accumulated surprisingly large flocks of sheep, herds of cattle, horses and grains. In 1825 it was credited with 76,000 head of cattle and 79,000 sheep, and there was a village at the Mission which Captain Benjamin Morrell estimated to contain 500 inhabitants. The Indians were dispersed and disappeared after the secularization of the missions by Mexico in 1833, and the lands and property of the fathers were confiscated to be regranted to settlers.

In 1837 a law was promulgated for the government of pueblos which remained in force until July 7, 1846, when California was taken by Commodore John D. Sloat. Two days later the American flag was raised in the old plaza of Yerba Buena, now called Portsmouth Square, in honor of the United States ship, then commanded by Captain J. B. Montgomery, the flag-raiser, whose name was given to the principal thoroughfare.

Twin Peaks, looking out Market Street C-381

It was as early as the spring of 1839, however, that Governor Alvarado directed the Alcalde, Francisco Haro, to make a survey of Yerba Buena and in the fall of the same year Juan Vioget, a surveyor, made the first regular survey and plan of what is now San Francisco. That survey merely covered the area between Pacific, Sacramento, Montgomery and Dupont streets. It may be mentioned in passing that in 1835, W. A. Richardson claims to have made a rough plan of a small area by official authority. (The United States vs. Jose Y. Limantour. Transcript of record p. 21 et seq.) But it is gratifying to note, even at this period, in the midst of confusion, that the germ of artistic planning was not foreign to the minds of the founders, although it did not bear abundant fruit. In making grants of house lots, it was ordered that "they shall be in as good order and arrangement as possible, and as the situation of the place may require, in order that the streets and plazas which may be formed may have, from the beginning, proper uniformity and harmony."

The wagon road to Yerba Buena from the Mission was built in 1838. Then the village slumbered until awakened by the guns saluting the flag and, a little later, by the clarion cry of "Eureka!"

In March, 1847, nine months before the discovery of gold, General S. W. Kearny, after whom Kearny street is named, then Military Governor of California, ordered the sale at auction of beach and water lots, excepting those reserved by the Federal Government, "for the benefit of the town of San Francisco." Jaspar O'Farrell, a surveyor, was employed to lay them out, which he did to the number of 444, between Rincon and Telegraph Hill, in size 45 feet 10 inches by 137 feet 6 inches. These lots were designated on the official map made by Wm. M. Eddy, city surveyor. Another survey was subsequently made of 328 more lots by O'Farrell, who in trying to reconcile his work with that of Vioget experienced considerable difficulty. Vioget's lots had angles, obtuse and acute, which had to be brought into the uniform plan so that streets would cross each other

View of San Francisco from Twin Peaks C-382

at right angles. O'Farrell proposed to widen Dupont and Kearny streets, laid out by Vioget, but the expense was considered too great. Many years later these streets were widened at a large cost, the burden falling on the property one-half block distant east and west from the line of the improved street. Kearny street was widened from 45 to 75 feet, the 30 feet having been taken from the west side at a cost of $579,000. Damages and benefits were assessed by a commission. Dupont street was widened in 1878 in the same manner and renamed Grant avenue. Montgomery street was opened to Howard street, and Montgomery avenue, a great diagonal thoroughfare, was cut from Montgomery and Washington streets northwesterly to the bay—the cost of which has never been met on account of fundamental irregularity in the issuance of the bonds. None of these expenses were assumed by the city but were expressly made a district charge and the property of the district was made liable, under a prescribed procedure. It is unjust to put the whole burden of such improvements on a small district where the city is also a large beneficiary.

The scandal arising out of the Dupont street and Montgomery avenue widening and extension bonds has been an injury to the city's credit, and yet the city is not responsible, and before the bonds were issued it expressly disavowed responsibility. The bond buyers were obliged to look to the regularity of the proceedings of the commissioners charged with the duty of issuing the indebtedness.

Jaspar O'Farrell also delineated Market street—an avenue which is unique among city streets in that it seems, like a great river, whose flow is augmented by many tributaries, to drain all other streets. It was given its direction by the respective locations of the town and the Mission, which it practically connected. The survey made south of Market street bore but little relation to that on the north. The historian, John S. Hittell, says that "O'Farrell correctly appreciated the importance of making the main streets in the southern part of the town agree in general direction with a route

followed by people going from Yerba Buena Cove to the Mission." That was well enough, no doubt, for his period, but since then the south side has developed on independent lines, irrespective of the Mission, and it is necessary to connect it more intimately with the north side by opening new streets and diagonals.

At the period of the O'Farrell surveys the population of San Francisco was shown by a census to be four hundred and fifty-nine. This number did not include soldiers nor the inhabitants of the Mission-village of Dolores.

Then came the discovery of gold in January, 1848. The population increased by leaps and bounds. O'Farrell's lots were all sold, and, in October 1849, the ayuntamiento ordered Eddy to extend the survey to Larkin street north of Post street and south of Post to Leavenworth and Eighth streets. One hundred-vara lots sold for $500, and fifty-vara lots for $200.

In 1850 a franchise was granted for a plank wagon road from California and Kearny to Fifteenth street, by way of Mission street to the Mission Dolores. Mission was favored over Market street because the latter from Second to Fifth streets was covered by a high ridge of sand. There was a deep cut in the sand hills at Kearny and Post streets where tolls were collected. This road did not become free until 1858.

In 1851, Congress created the land commission to settle land claims in California. In taking the country, Commodore Sloat had proclaimed that persons in peaceable possession under "color of right" should be protected in their holdings. This promise was ignored by the Act and the result was that squatters entered upon lands in and about the city and became a political power. The native California rancheros lost half their holdings to the lawyers and the other half in living during the litigation, and awaiting for a patent issue—and so the Noe, Bernal, de Haro and other grants in or near San Francisco were dissipated. Just as the time limit set for the filing of claims before the commission was about to expire, in March, 1858, the Limantour, Santillan and Sherrebeck claims were filed for nearly all the property south of California street and west of Second, which after long litigation, were rejected; and Dr. Peter Smith, for medical services to the city, had a sheriff's deed following a judgment for much city property, which ultimately was invalidated by the courts in so far as it affected pueblo lands; but other properties were confirmed to him.

The boundary line of the City of San Francisco, as fixed by the act of the legislature, approved April 15, 1851, reincorporating the city, was as follows:

On the south by a line parallel with Clay street, two and one-half miles distant, in a southerly direction, from the center of Portsmouth Square, on the west by a line parallel with Kearny street, two miles distant, in a westerly direction, from the center of Portsmouth Square. Its northern and eastern boundaries shall be coincident with those of the County of San Francisco (i.e. the bay).

The westerly boundary line so fixed coincided, nearly, with what is now Devisadero street, and the southerly line with Twenty-first street.

By an act of the legislature, passed March 11, 1858, Ordinance No. 822, passed by the Common Council of the City of San Francisco, June 20, 1855, was ratified and confirmed. By this ordinance the city relinquished all claims to lands west of Larkin and Johnston (Ninth) streets, and within the boundary line, as fixed by the act of 1851, to those persons, and their successors, who had been in actual possession thereof from January 1, 1855, to June 30, 1855, and as to those lands lying east of said streets and above high-water mark, to those persons who deraigned title from grants made by the alcaldes or municipal authorities of the former pueblo.

By section 5 of the ordinance the city reserved the right to select and

reserve such parts of the lands lying west of Larkin and Ninth streets, and within said boundary line, as might be necessary for public purposes, such as school houses, engine houses and squares, and in pursuance of such plan another ordinance, No. 845, was passed September 27, 1855, and likewise ratified by said legislative act, providing for a commission to prepare a plan of streets, squares and public building lots within this portion of the city.

Such a map was accordingly prepared (since known as the Van Ness map), and by another ordinance, No. 846, passed October 15, 1856, likewise ratified by said legislative act, it was "declared to be the plan of the city, in respect to the location and establishment of streets and avenues, and the reservation of squares and lots for public purposes in that portion of the city lying west of Larkin street and southwest of Johnston (Ninth) street," as defined by the charter of 1851.

By an act of Congress, approved July 1, 1864, such ordinances, and the act of the legislature ratifying them, were referred to and approved, and the United States relinquished all claims to the lands delineated on said map for the uses therein respectively designated.

The rights of the city to its public reservations thereby became fixed and determined, so far as that portion of the city lying east of Devisadero and north of Twenty-first streets was concerned.

As to the lands outside of the charter line of 1851 (i. e. west of Devisadero street and south of Twenty-first street), no action was taken by the city in the matter of confirming the title of private persons or making reservations of land for public purposes until 1868, when Ordinance No. 800, approved January 14, 1868, was passed by the supervisors. This ordinance, which was confirmed by an act of the legislature approved March 27, 1868, provided that the supervisors should immediately proceed to subdivide into blocks such portions of the city and county lying outside of the charter line of 1851 as they might deem expedient, and to make necessary reservations of lands for public building sites, squares and a park. In pursuance of this plan, the Committee on Outside Lands of the Supervisors caused to be prepared a map of that portion of said lands lying north of the Rancho Laguna de la Merced and the San Miguel rancho and of Islais creek not reserved by the United States, whereon were delineated streets, and reservations for school houses, engine houses, a cemetery, public squares, a city and county hospital and Golden Gate Park. Such map, so prepared, was finally approved and adopted by the supervisors as the city map by Ordinance No. 823, approved July 24, 1868, and has since been known as the Humphreys map.

By said Ordinance No. 800 the title of the city to lands outside the charter line of 1851, and not embraced in Spanish grants, such as the San Miguel rancho, nor reserved by the United States, nor by the city for public use, was relinquished to such persons who were in actual possession thereof on March 8, 1866, and had paid taxes thereon for five years next preceding July 1, 1866.

The title to this territory was thereby settled and fixed, and the right of the city to public property lying therein determined.

All of the other lands lying outside of the charter line of 1851 are embraced within what were originally Spanish ranchos, the title to which was derived directly by grant from the Spanish or Mexican governments, namely, the Rancho Laguna de la Merced, San Miguel Rancho, Rancho Rincon de las Salinas y Potrero Viejo, and the Rancho Canada Guadalupe Rodeo Viejo y Visitacion. Various persons and corporations deraigning title through these different grants at different times filed and recorded maps of tracts lying within their boundaries, whereby the streets thereon delineated were dedicated to the city, the most prominent of these being the Horner's addition, O'Neil and Haley tract, and the South San Francisco Homestead Association.

I quote John S. Hittell on the disposition of public lands which presented the greatest opportunity the city has ever had to make every reservation necessary for its park system and civic uses, and although the question was discussed and, even, a Park plan procured from the greatest of American landscape gardeners, Frederick Law Olmstead, the city council, to a great degree, may be said to have been remiss. It did make reservations, including the Golden Gate Park, which should probably mitigate one's final judgment. The criticism seems to lie against the fact that the council did not reach the possibilities of the occasion to make a city unparalleled in beauty, with boulevards, public places, parks and playgrounds, proper sites for museums, libraries and other utilities, which were well within its grasp. Mr. Hittell tells the interesting story thus:

"The title of the city to about four thousand acres of land west of Larkin street having been perfected, ordinances were passed to convey it to the parties in possession and to give them deeds for it. In 1853, the city as successor of the pueblo of Yerba Buena, presented its claims to the federal land commission for four square leagues, about seventeen thousand acres, under the Mexican law, giving so much for common or other public purposes to every pueblo or town. The claim was confirmed in 1854 by the land commission for about ten thousand acres, including all that part of the peninsula north of the Vallejo line, which started near the intersection of Fifth and Brannan streets and ran through the summit of Lone Mountain to the ocean. Both parties, the city on one side and the land agent of the federal government on the other, appealed from this decision, and in course of time the case reached the Federal Circuit Court, which on the eighteenth of May, 1865, filed a decree confirming the claim to the city to four square leagues above high water mark, 'for the benefit of the lot-holders under grants from the pueblo, town or city of San Francisco, or other competent authority, and as to any residue, in trust for the use and benefit of the inhabitants of the city.'

"An appeal was taken from this decision on behalf of the federal government to the United States Supreme Court; but on the eighth of March, 1866, congress passed an act confirming the decree, and granting to the city all the title of the United States to the tract described in the decision of the Circuit Court, with the exception of lands needed for federal reservations, subject to the conditions that all of this land not needed for public purposes, or not previously disposed of, should be conveyed to the persons in possession. The only opposition to the city claim recognized by the law was that by the United States; and when congress granted the federal title to San Francisco, there was no basis for litigation, so the United States Supreme Court dismissed the appeal, and the decree of the Circuit Court stood as the true basis of the title. That decision gave the land not already disposed of 'in trust for the use and benefit of the inhabitants of the city'; the act of congress gave it for the benefit of 'the parties in the bona fide actual possession thereof.' The inhabitants were many; the people in possession were few, but they had money, political influence, organization, and the legislature passed an act providing that everybody in possession of not more than one hundred and sixty acres, should keep it all. The supervisors passed the Clement ordinance recognizing the ownership of the people in possession, and the McCoppin ordinance, giving deeds to them. Thus a domain which might have been sold for millions of dollars, or given in small lots to ten thousand poor citizens, anxious to secure homes, was bestowed upon a few. The giving of such large areas was not in harmony with the town system of Mexico, and the possessory titles within the limits of the Pueblo claim were void under the American law; nor was their recognition consistent with sound public policy, but it received the sanction of the legislatures, councils and courts. The city out

Market Street at Montgomery 35 Years Ago, looking up Post Street C-383

The Same Locality To-day, looking up Market Street C-384

of all this vast domain reserved a park of one thousand acres, mostly drifting sand, and some lots for public squares and buildings."

Lafayette Park, for instance, was designated and delineated as a public square, and by legislative acts was irrevocably dedicated to such purpose. The land so selected had been in possession of its claimant as far back as 1855, before the Van Ness map was made. On December 17, 1864, he commenced an action in the 4th District Court against the City and County of San Francisco to quiet his title to certain designated portions of said square, and final judgment was rendered in his favor, December 25, 1867, the principle upon which the decision was based being that it was not within the powers of the commission, which prepared the Van Ness map, to set apart for public use more than one-twentieth of the land in possession of any one person, which was done in this case. The Supreme Court held that this judgment, while erroneous in point of law, was binding upon the city under the principle of res adjudicata, not having been appealed from. (76 Cal., p. 18, and 93 Cal., p. 251.)

The situation as to the Hospital lot, so called, now in part, Duboce Park, and Mission Plaza, now wholly in private ownership, is practically the same, legally, as that of Lafayette Square, similar judgments having been rendered in each case. (See Opinions of City and County Attorney Creswell, pp. 325, and 423.) In other words, the neglect of city attorneys in the earlier days lost to the city much valuable property. They failed to put in an appearance and allowed judgments to go by default.

Even the harbor of San Francisco was in 1861 awarded by a corrupt legislature to a private corporation to collect wharf tolls for fifty years, but the measure was vetoed by the then Governor Downey as Governor Purdy before him had prevented the extension of the wharf privileges then in private hands.

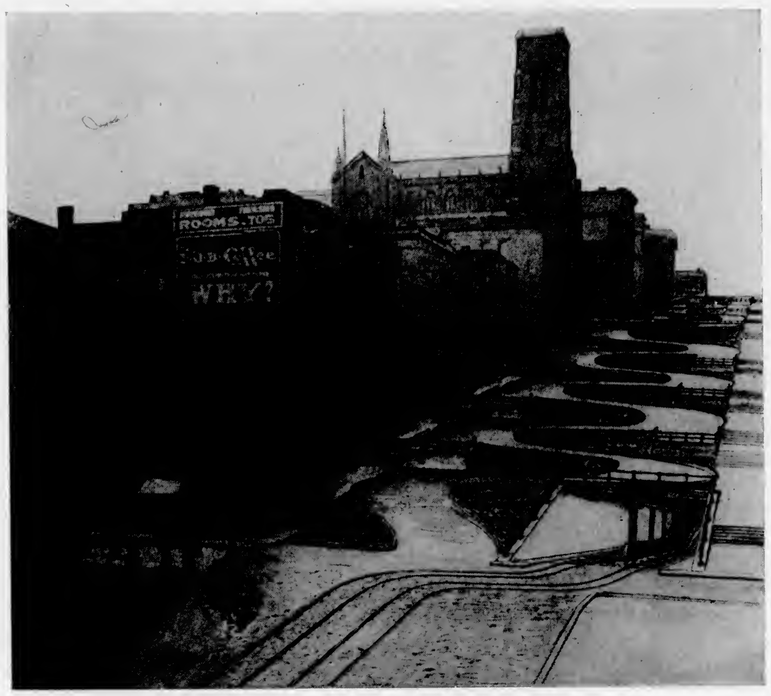
The "outside land" reservations referred to comprise 1,347.46 acres out of a total acreage of 8,400 distributed as follows:

Golden Gate Park	1,013.00 acres
Buena Vista Park	36.22 acres
Public Squares	35.46 acres
Other Reservations	21.25 acres
Cemetery	200.00 acres
91 School lots	30.13 acres
32 Engine lots	2.31 acres

The miscellaneous reservations were for lots for such purposes as the Academy of Sciences, Foundling Asylum, City Hall and Library, County Jail, Home for Inebriates, Home for Veteran Soldiers, Hospital and Ladies' Relief Society, all beyond Devisadero street west.

There was practically no dispute among the members of the Board of Supervisors as to the minor reservations, but the question of a greater or smaller park, its dimensions, direction and form, divided the board.

The majority of the outside lands committee favored a 1000-acre park which should unite the city and the ocean beach, but they opposed the extension eastward farther than Stanyan, and later Baker street (where the entrance now is), because in their opinion, the cemeteries to the north could "never be cut by a street" and the government reservation, they said, "obstructs traffic and the park, if extended citywards, would be a further obstruction to cross-town travel." They had no conception of a boulevard or park drive. It was either park or street in their view and hence the city lost the Panhandle extension at the time when it should have been made.



Proposed Terraced Roadway in California Street, with Tunnel for Cars C-385

The Board of Supervisors were importuned in vain by certain sagacious citizens to carry the great park down to Yerba Buena Park, where now stands the City Hall, but at a critical moment they lacked the necessary judgment and foresight. The press (see Bulletin of January 27, 1867) advocated a bell-shaped park comprising the ocean front on the west and extending like a "handle of the bell," by a broad avenue to Market and Larkin streets, where the city owned the Yerba Buena property.

Frederick Law Olmstead's report was before the board at this time, but, except as to landscape features, it seems to have been ignored. One committee refers to the "artificial way" proposed by him, meaning no doubt his treatment of Van Ness avenue, but it quotes approvingly from his report as follows, which is a justification for the Panhandle or Bell-handle extension of the park, citywards, in order to cultivate its convenient use and give it a worthy entrance—a park in truth stretching from the city to the sea: "The entrance to it (meaning any park) should be practicable and no great distance from that part of the town already built up; that it should extend in the direction in which the city is likely to advance or should be so arranged, that an agreeable extension can be readily made in that direction hereafter." (Municipal Reports 1867-68.)

What was Olmstead's plan? He did not possess the prevision of the future nor properly estimate the possible fertility of San Francisco's sandy soil, so he confined his recommendations to the region extending from the present German Hospital's lands, near Duboce Park, by way of Van Ness avenue to Fort Mason (Black Point). He parked Van Ness avenue and suggested a boulevard eastward on Eddy street as far as Market, and from Van Ness avenue and Eddy street diagonal avenues running to Yerba

Map Showing Comparative Densities of Population in San Francisco C-386

Buena Park and to Duboce Park (now so called), and in the valley at this point he recommended extensive park grounds. Van Ness avenue was to be widened to a width of 390 feet and parked and the center sunken for the creation of a sheltered mall 20 feet deep with sloping sides, crossed by artistic bridges. This feature was no doubt suggested by the winds of summer and he had mistakenly satisfied himself that sheltering trees could not be made to grow, as in other places. In the light of subsequent development this part of his report possesses curious interest. He says: "It must, I believe, be acknowledged, that neither in beauty of green sward, nor in great umbrageous trees, do these special conditions of the topography, soil and climate of San Francisco allow us to hope that any pleasure ground it can acquire will ever compare in the most distant degree with those of New York or London. There is not a full grown tree of beautiful proportions near San Francisco nor have I seen any young trees that promised fairly, except, perhaps, of a certain compact, clumpy forms of evergreens, wholly wanting in grace and cheerfulness. It would not be wise nor safe to undertake to form a park upon any plan which assumed as a certainty that trees which would delight the eye can be made to grow near San Francisco by any advantages whatever which it might be proposed to offer them. It is perhaps true that the certainty of failure remains to be proved, that success is not entirely out of the question, and it may be urged that experiments on a small scale should be set on foot at once, to determine the question for the benefit of future generations; but, however this may be, it is unquestionably certain that the success of such experiments cannot safely be taken for granted in any general scheme that may, at this time, be offered for the improvement of the city."

He adds San Francisco could form a park "peculiar to itself," but, of course, unlike others elsewhere. All of Mr. Olmstead's suggestions were excellent, (excepting his misconception of the growth of trees in sandy soil and his sunken mall, predicated on this misconception) and if followed, as supplementary to the creation of Golden Gate Park, which he failed to suggest—a remarkable oversight—would have created and adorned an inner circle of drives—or perimeter of distribution—and, at a small expenditure of public funds, would have given to San Francisco the very improvements it craves for to-day—forty years later. The city has a great park—a possession to which he would have led the city ultimately—for he spoke of future expansion; but he dwelt particularly on the need of smaller parks, open spaces, parkways and ornamental avenues near the populous centers for the actual use and benefit of the people.

In spite of mistakes, unhappily made, San Francisco has grown, but it has grown on the original lines which had been laid down by the pioneers; the rectangular blocks on the hills have become fixed and difficult of modification; the great park, however, has developed into the finest pleasure ground in the world, due not only to its careful cultivation but to its superb termination on the shores of the Pacific; the Presidio government reservation has become really an auxiliary park containing 1500 acres of forested lands overlooking the Golden Gate, and the city, by the recent acquisition of seven blocks, has united the two great bodies of land. By the issuance of seventeen million dollars of bonds in 1905, the only outstanding municipal indebtedness, the city is now about to acquire the following utilities: Hospital, $1,000,000; Sewers, $7,200,000; Schools, $3,500,000; Street Pavements, $1,621,000; Jails, $697,000; Library, site and building, $1,647,000; Golden Gate Park and Presidio extension, $330,000; Children's play-grounds, $741,000; Mission Park, $293,000.

All the improvements contemplated by this bond issue will accommodate themselves to the new plan of the city.

The capacity of the city to borrow by the authorization of a bonded indebtedness, two-thirds of its citizens voting therefor, is fifteen per cent of the assessed value of all its property, which now (1906) is five hundred and twenty-four millions of dollars, which represents an increase of two hundred millions in the past decade. The limit of indebtedness therefore, is about eighty millions with a possible decennial expansion of thirty millions. The city's population is estimated at nearly 500,000. The commercial and industrial greatness which had been predicted for San Francisco from the earliest times has been fulfilled, and, as in older communities, a love of the true and the beautiful, a craving for artistic betterments and a sense of public duty have succeeded the hard struggle to tame the wild earth, explore its secrets, raze the forest, build the city and command the sea.

San Francisco gave itself in 1900 a new charter, by which responsibility is fixed, power given, home rule assured and a limit of one dollar is established for taxation, exclusive, however, of provisions necessary for park maintenance and the interest and sinking funds for bonds—in other words, no limit is imposed for public improvements, but every safeguard is exacted against operating extravagance. Under this charter the bonds have been issued and declared valid by the courts.

In 1904, Daniel H. Burnham was invited by the Association for the Improvement and Adornment of San Francisco to prepare a plan, and, in September, 1905, he, ably assisted by Edward H. Bennett, completed it, and it was accepted by Mayor Eugene E. Schmitz, after formal ceremonies of presentation by Vice-president Wm. Greer Harrison, at a special session of the Board of Supervisors, which gave it official recognition by ordering it printed as a municipal publication.

San Francisco, on account of its equable climate and its unparalleled natural advantages, located as it is, on bay and ocean, and seated upon many picturesque hills, is destined to be great not only commercially, but great artistically. Its peculiar metropolitan capacity to serve as a hospitable place of entertainment, yielding the most amount of comfort and of pleasure to its inhabitants, increasing their number and holding them by ties of interest and affection, has given it unique distinction.

In these latter years the city has wisely become conscious of its former self-neglect, and a strong sentiment pervades the community that improvement and adornment should be bravely begun, first, by the adoption of a comprehensive plan, which has just been accomplished, and then, by putting its recommendations into effect. That is the work which is now before the citizens of San Francisco.

What the people have needed is an ideal with which to nourish their imagination and to give them a goal towards which to labor with confidence. That they have in the Burnham plan.

* * *

"My dear Jane," said the mistress of a household, "you have served us now faithfully for twenty-five years. We shall henceforth regard you as a member of our family. You will receive no wages!"

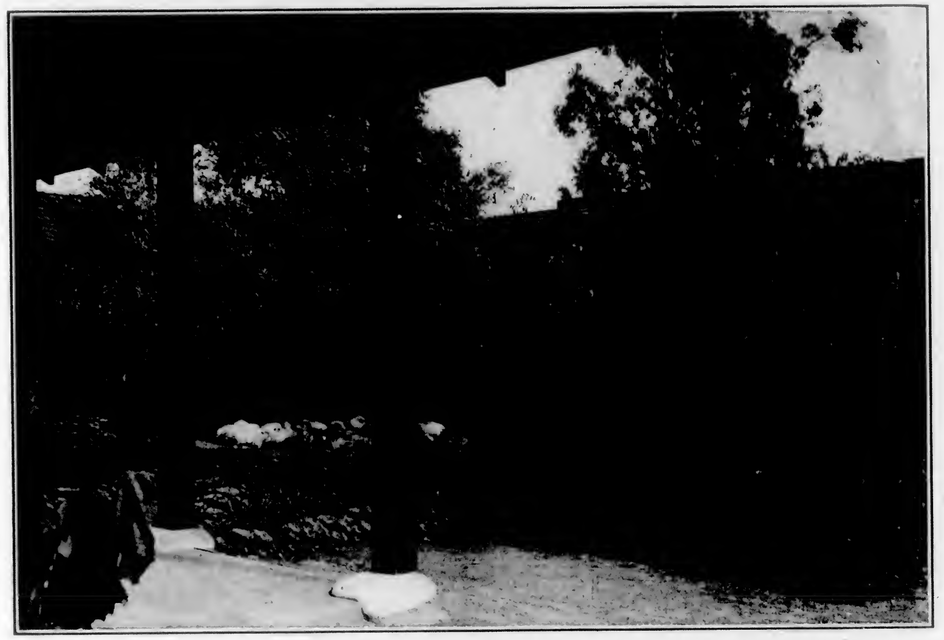
Bungalow Home of the Author C-387

IN THE making of homes there is in America no truer expression of the individual taste and needs of the people than the bungalows of California.

In fact, an art connoisseur of wide reputation who recently visited California waxed so enthusiastic that he declared it to be the most simple and beautiful type of the American home. Its evolution is interesting and its simplicity is responsible for its beauty. The same hypersensitive intellectuality that it takes to write a beautiful poem or to paint a beautiful picture, must be brought to bear in the making of a home if it would be beautiful. There must be a feeling for line, and, above all, for color. The very ground on which it grows needs be selected with forethought—the background of the home! Many things work together for the making of delightful small homes in California. There is the climate, allowing great possibilities, the material in vast variety, and, most of all, it is the mecca for artists, writers, thinkers,—for beauty-loving people, as is the south of Italy.

Artistic people are frequently not money-getting people. And these bungalow homes have not to do with money, speaking in the comparative sense. They have been thought out with the direct purpose of saving money. A beautiful home with the least possible expenditure has been the motto. To begin with, some independent soul bought an out-of-the-way plot of ground, built a low, rambling house in keeping with the location, made it in color to harmonize with the grass, the trees, the flowers—called it a bungalow, and lo! a new era of home-making was upon us. Others who loved the beautiful saw that there were possibilities outside of regulation lots and conventional houses, and they began thinking out the particular house suited to their needs, and of making it their own rather than copying their neighbor's.

The California bungalows stand for emancipation in home building. They have been designed with no previous custom in mind. Ground that in



"The Patio" of the Bungalow in the Arroyo Seco (Idah Meacham Strobridge) Los Angeles, California C-388

no wise would do for the ordinary house, as square as a dice and so high it threatens to topple, has been made a good setting for a house designed especially to suit it. Success in many instances tempted other would-be home-makers to try their originality in home-making, until California to-day is famous for her picturesque and original, as well as economical, homes.

This simple form of architecture has found favor with people, who, like the man on being asked what kind of a house he lived in, exclaimed laconically, "In a barn; but, thank Heaven, I know my own front door." The marked originality of these bungalow homes is due to the fact that they have in every instance been designed for individual tastes and needs. There is no postage-stamp repetition about them. They vary in size, character, and general construction, as they vary in location, being ubiquitous along the Pacific Coast, from San Diego to San Francisco, and even farther north. A delightful cosmopolitanism prevails about them—for while traditions for the most part have been left behind by the wayfaring Californian of to-day, yet, unconsciously or subconsciously, there creeps into this unconventional western home a suggestion of the elements in a home he has loved best elsewhere. Undoubtedly the native Californian has been more influenced by the Spanish adobe than any other form of architecture, though the days of adobe are past, unfortunately, for picturesque house-buildings, and fortunately for hygienic and practical reasons. But the early Spaniards and Mexicans instinctively had a feeling for good lines as people who live near to nature and are not hampered by other people's ideas usually have. There was no ornament, useless or otherwise, about their houses, and these are the watchwords of the good present-day small house. Here is one of the cardinal points in which it differs from the cottage. The cottage, generally speaking, makes pretensions—it sets up airs in keeping with larger and more elegant places of residence. Then, too, the number of rooms in a cottage is

entirely out of proportion with its area. There is the hall with fussy hat-racks,—the parlor, if you please, often furnished in white and gold—the key-note of Louis XVI. drawing-rooms, and a dining-room that opens from this parlor, as if you would put together two pine boxes and then cut a hole between them. Nor would it be in keeping with the canons laid down for these houses to let so much as a mite of real construction show. And if, perchance, a half-dozen people by any prearrangement or mere coincidence happen to appear at one of these houses at the same time, each and every one must have the feeling that he is a human sardine being packed in a box, alive.

All cottages are not bad any more than all bungalows are good; however, the one is the antithesis of the other. The bungalow decries ornament, and at least is free from pretensions. Its claims to beauty rest not only on its simplicity, but on its adaptability to its environment, its careful proportions, good lines, and its outdoor features, as well as its real construction, which is usually in evidence.

The illustration of "A Bungalow in the Arroyo Seco" pictures one of the most perfect of these Southland homes—a veritable chef-d'oeuvre. There are two hundred and fifty running feet of wide porches, screened in, where the family live, besides a patio, around which the house is built. There is a long veranda on the front, which is cool in summer with the breeze from the sea; another divides the house in twain, and there is still another running the length of the house on the patio side. Here, if you are so fortunate as to be asked to dine, you may listen to birds and to the falling leaves of the sycamore trees, as white in the light as the cloth on the board. There are wide couches, palms, easy chairs, comfort, beauty, everywhere. The woman who planned its every detail will open the front door to you if you should knock there. She has not slept in the house for years, and she can tell you of the real joy of living in California. There are homes which we all know, costing thousands, that do not approximate this one in point of real beauty—"A low roof with green trees half-concealed," it has, soft brown color and, most of all, an air of home. No one ever built one just like it before—it is individual in every particular.

Many of these bungalow houses are simply boarded up inside and out and battened, and with few exceptions the front door opens into the living room, which is very large, being living room, reception room, library, and den in one, and frequently one end of these large rooms is used for dining-room, a screen or heavy curtain dividing it from the main part, making it as exclusive as need be. To be sure, a dining-room is more desirable, but where the money is not sufficient to build other than a small house, one splendid room is preferable to two small ones, both from the point of effectiveness and as comfort.

The kitchen and pantry arrangements of these houses are planned to save work, and the sleeping rooms are sufficient for the family use—there is seldom especial provision for guests.

One or two of the illustrations show houses which were designed wrong-side out—with the studding on the inside and between these the plaster, the lathing having been done on the outside, and rough boards nailed over. The joists show overhead, and everywhere the construction is evident. The living room is of goodly proportion, being long and narrow, with one end used for a dining-room. You enter through an old-fashioned Dutch door, the author of this house having had a penchant for this sort of door "back East." The front door of nearly all of these houses receives particular consideration—being large, and designed with special regard to the hospitality they open to you. The fireplace in this room is a huge one of clinker brick. This brick has found favor with a vast majority of bungalow builders. It is rustic in effect, excellent in color, and lends itself to both exteriors and interiors. The

Screen Veranda, where the family dine throughout the year, showing a corner of patio and bungalow. Idah Meacham Strobridge C-389

windows in this room are so many as to make one imagine he is looking through a spider's eye, and have small panes and casements that swing out. The windows of the small house are of most importance—the bungalow here takes issue with the cottage. The bungalow is never guilty of plate glass, an item to be set down in its favor. Cottages have a liking for picture windows, which are apt to make a small house look like a little bug with big eyes.

The boarded-up bungalow, of which there is a picture, belongs to the scion of one of California's oldest and best-known Spanish families. Its location is superb—among the oaks, with a panoramic view of the mountains extending for miles around. The patio is in front, where flowers bloom perennially. French doors open into this countyard from every room that is in sense a living room, even the bedrooms. The house rambles to suit its will, and there is plenty of ground, so that the wings of the house do not elbow each other. There never was seen a more splendid fireplace in any house of its kind. It is of cobblestone, in the center of the long side of an immense room, with big stones at the bottom, gradually growing smaller towards the top, with one huge stone on the hearth for a seat. There is about the bungalow the old-time simplicity of the adobe, an aroma of hospitality and romance that must have been wafted from the ancestral home, set as this is in God's green acre.

There are so many ways of making these houses. Rough boards—the rougher the better—put on lengthwise, are rustic enough in appearance to pass muster in the ranks where surfaced materials are prohibited. Plaster is not tabooed entirely, though it must be rough, and used in connection with

Bungalow of Arturo Bandini. A beautiful bungalow that is boarded up and down, inside and out, with a patio in front C-390

plenty of wood, but wall paper is not quite appropriate. Burlap, however, both natural and colored, is looked upon with favor, and rightly, for its rough surface makes a pleasing combination with rustic effects. Canvas, too, is very good, and there is one little bungalow, hidden away under the branches of a live oak tree where khaki has been used above a wainscot of pine, stained brown; it curtains a door that leads to a stairway and hangs at French windows, opening upon a hillside. This soft, tan-brown comes in line with the green outside, and no one would guess its real texture.

The California redwood is a boon to builders of houses where every man wishes to make his house his own. It has more possibilities than any wood obtainable, since it takes so many different stains with so many different results. If left natural with white lead rubbed into its surface, it retains the fresh pinkish color that it shows when first sawed, combining beautifully with green in the same scale of color. Where a dark effect is desired, a little green used with a mahogany stain gives it the most wonderful coppery look. Even the outside creosote stains may be used on the redwood; in fact, there is no end to the ways of treating it. Shasta pine is the best wood to stain brown or green; in brown, especially, it allows a range of shades, from the natural color to the almost black of the English oak. There are burned effects to be gotten, and various ways of treating the wood with chemicals, resulting in some good tones of gray, all suitable to the interior finish of the houses under discussion. These experiments in house stains are interesting in the extreme to the person who has a little of leisure and is responsive to color.

The furnishing of these homes is much more difficult than one might suppose, for the simplicity and rusticity of the bungalow puts rather careful

East End of the Living-Room C-391

Dining-Room End of the Large Living-Room C-392

restrictions on its furnishings. The coloring, to begin with, must be strong, never with any suggestion of daintiness, for color alone may give a feeling of weakness or of strength. The colors of the woods are best suited to them—greens, browns and the dark, dull reds of autumn. And if blues ever creep in, they must be in small proportion and used with another color. The blue of the eucalyptus combined with its green, for instance, illustrates the meaning.

When it comes to the actual furniture, the so-called Mission style, which varies in design, as do the houses, is for the most part quite appropriate. It may be stained to match the wood, and many a man who has built his own house has been able to construct his furniture as well from these models, patience being the main tool used in its making, along with careful measurements and well-seasoned wood. Collectors of Indian baskets, curios and rugs have found a fitting background for their collections in these houses built with head and hand. The bright blankets, which are too strong in color to suit the ordinary cut-and-dried house, are admirable on the floor of a rustic bungalow, and Indian baskets make a frieze that is not only interesting, but beautiful in color against a dark-beamed ceiling. These, along with the pottery used for wild flowers, will make a surprisingly good room. Quaint things from Mexico you find if you peep into a few fortunate homes, though they are infrequently found, as few are fortunate in possessing these treasures, since the people in the part of the world from whence they come do not so often part with their treasures, as we transitory, money-loving Americanos. Old furniture that has seen passage on high seas, and been held captive about the Horn, has found its way into California in surprising quantities. "Bungalites" have been keen after it for years, and if one should judge from appearances, it finds a congenial home in the California bungalow.

The inadequacy of suitable floor covering for rustic houses is responsible for the revival of an old industry—that of weaving rags into rugs. A few years ago one could no more find a weaving establishment than one could find bricks of gold in the streets—now it is surprising, not only the number of places where rugs are made, but the beauty of the rugs as well. They are made of either wool or cotton, and usually some of the material has been dipped in the dye-pot in order to create the right coloring. When one considers the actual rugs permissible, the list is short. Those made of grass will do, and Oriental rugs, which are good anywhere under the sun, are perfectly suitable, providing they are not new and garish. The floor coverings popular for Colonial cottages are not suitable for the bungalow, and they constitute one of the problems of furnishing.

Even hardware and fixtures must have their own individuality and belong to this or that house, and can never be bought at random at the shop. They had better be congenial spirits with the light fixtures—made by the blacksmith or metal worker, as they frequently are, and in one house where handwrought things were not to be thought of, common japanned hardware was bought and soaked in lye, taking off the paint, and, after weathering, as it were, they had the appearance of something hand made.

So that when the California bungalows are noted collectively, individually and carefully, it will be seen that they are not stereotyped homes, but have been studied out as a whole from the standpoint of general effect, and then as to the nicety of detail. Some of the prettiest of them are so inexpensive as to be called, by their modest owners, shacks. Taste has been substituted for money. Money alone can no more make a beautiful home than taste alone can rear a palace. Even the very flowers that grow about their doors have been planted with a purpose. They do not bloom in a riot of color that offends the sensitive eye, but have been selected with a care as regards the proximity of their various colors. You will not see the gorgeous bougainvillea planted next a flaming red geranium any more than you will see one of these well-considered houses stained a green that declares war with the green of the grass about it. Stain is used rather than paint, always for the exteriors, unless a little is admitted of in the trim about the windows, shiny surfaces being held in light regard.

There are those overburdened with conscience, out of all proportion with the subject, who question the adoption by California of the Anglo-Indian word, bungalow, because they are not exactly like the Indian bungalows. The California bungalows vary in many essentials from the mother bungalows of India, but the term is worthy of expansion, and seems best suited to our one-story, rambling and most original of dwellings, in no wise cottages, which are better described by this word than any other.

An astonishing amount of artistic ability has been called forth in the making of these homes, and the California bungalow affords to many not only a beautiful and dignified home, but illustrates the possibilities of results when heart and head and hand work together for good.

EDITOR'S NOTE.—Reprinted from "The Pacific Monthly" by special permission of the publishers.

* * *

Surprised His Wife

A STORY is told of a Pennsylvania farmer who wore his old suit until every one was tired of it, and his estimable wife was almost ashamed of the hustling man who had been inside it so long. But one day he went to town to sell his produce, and while there he determined to buy a new suit and—happy thought—surprise Eliza. So he bundled a new suit into the wagon and drove homeward.

It was after night as he hurried homeward, and at a bridge over a river he stood up on the wagon and "peeled" and threw the despised old suit into the river. Then he reached for his new clothes. They were gone—had jolted out of the wagon. The night was cold and his teeth chattered as he hurried home. But he sure did surprise Eliza.

William Knowles, Architect C-393

Competitive Design for Tourist Hotel at Claremont Park, Berkeley

Heraclee

THE Boston Transcript translates the following article by M. Joseph Galtier which appeared recently in Le Temps: "I have lately heard talk of a scheme that seems to me genuinely noteworthy. Certain well-known Parisian artists, painters, architects and men of letters are about to found a city. Apparently they are actuated less by the rare pleasure of founding something than they are by the conscious need of escaping the excitement and promiscuity of the great centers of modern life. They dream of a quiet nook to which they can go to find shelter from the exactions and vulgarities of the social hurly-burly. They want to found their city as carefully as they would found a club. They want to make it a close corporation. Nobody will be allowed to live in it unless he has a clear title to citizenship in the Republic of Letters and Arts.

"The idea is certainly attractive, nor is there anything especially surprising about it. What more natural than that victims of our decrepit civilization should look back wistfully to the days when youthful tribes ceased their wandering at pleasure to fix their dwelling in a land of their choice? What more alluring than to quit the smoky, horizonless metropolis and enter the land of sunshine and there—with one's own hands, so to speak—to build an ideal home in a city peopled only by one's chosen friends? For these impassioned builders all have the same tastes, the same aspirations.

"They're as madly in love with their future city, I imagine, as Horace was with his villa. They make it the symbol of their independence and the guaranty of their repose. No one will work in the future city, say they. It will be purely a city of rest. Its people will never be disturbed by anxiety for the future. They will bask in the present like shrewd epicureans and evoke from the past its most endearing memories. With no ambition save that of tasting the sweets of existence with artistic delight, time will pass altogether deliciously. And time will be infinitely valuable, for nobody will think of setting a price upon it and declaring it to be 'money.' Time will be loved for its own sake only.

"We shall have fled far, indeed, from the current ideas of living. We shall have returned to the olden ages that knew nothing whatever of the complicated machinery that stamps human existence with incessant trepidation and an ever increasing feverishness. Our founders don't intend to put all the resources of recent inventions at the service of their enterprise. Their city won't be the last word on scientific perfection. It won't in the least resemble a roaring Anglo-Saxon town. Rudyard Kipling will never chant its charms. Its serene graces would be better celebrated by a John Ruskin, who would admire this return to simplicity, quietude and the worship of nature.

"The site of the future city has already been chosen, and attests the aesthetic taste of those who—to-morrow, perhaps—will be its first inhabitants. Like all famous cities—those mothers of civilization—the city will rise in the basin of the Mediterranean. By the shore of that sounding sea which cradles the childhood dreams of our race, upon a site that possesses the harmonious lines of Greece and the luxuriant verdure of the Orient, and at the head of a gulf with shores drawn gracefully in broad curves like those of the acanthus leaf—there you will one day find the new city. It will rest upon French soil. The chosen spot lies hidden away on the Cote d'Azur in a nook quite remote from the regions pre-empted by fashion. It is just behind the islands of Hyeres. M. Sardou already owns a hillside holding there.

"Properly speaking, the location has not been discovered; it has been rediscovered Our ancestors knew it well and valued it so highly that they built a city there and named it Heraclee. The new Heraclee will accordingly replace

William Knowles, Architect C-394

Plan for Proposed Hotel at Claremont Park, Berkeley

the ancient one. Still upborn, it boasts a high and noble lineage, and it will link its future to an illustrious past. Heraclee de Gaule flourished during the twelfth and thirteenth centuries of our era, and had many lovely villas belonging to merchants from Marseilles and wealthy Ligurians.

"Our artists are pleased to place the resuscitated city under the protection of Hercules—just as it was in the olden times. They doubtless expect that their propitiatory worship will yield them a sound and sane repose, for they don't attribute too precise a significance to this idea of patronage or seek to make a dozen illustrious works the prerequisite for admission. That would be altogether too aristocratic a conception. And yet one foresees that upstarts won't find it easy to enter the promised land. Heraclee will be a place for those upon whom Fortune has deigned to smile. Only proud mortals with handsome incomes will stroll its streets. Heraclee will be an object-lesson full of encouragement for future generations.

"Will Heraclee ever exist? Will the project whose charms I have just exhibited ever be realized? Is it anything more than a poetic dream? I hastened to hunt down all the Heracleans I could hear of, and when I caught up with the first of them—a man still young and vigorous—he showed me two large photographs that lay on the sofa in his study.

" 'Here are two views of the chosen spot. You see we are not merely building air castles. It's a lovely place! The valley is rich in tall palms, while the hills—as elegantly outlined as the Tuscan mountains—are covered with pines. The sea forms a bay with magnificent curves, and the Manres Mountains shelter the whole region from the awful blasts of the mistral. It's a wonder it's been left uninhabited. The glitter of fashion has never visited it. It's almost like a little island. The thought of one day going to live there is a sure cure for ennui, and the sight of that exquisite bay, where I can already see my cottage, consoles me for the rains and fogs of Paris. Even now I take refuge in Heraclee in my leisure moments. I could wish that I might have nothing but leisure moments.

" 'The supreme charm of Heraclee is the certainty that tasteless houses won't be tolerated there, or sumptuous villas or pretence of any sort. Every new building must first be approved by the "citizens," and they'll see to it that the site isn't dishonored. Besides, M. Nenot, the celebrated architect, has already made us some drawings, and he will be regularly consulted so as to check the caprices of property-holders.'

"I took pains to call upon this M. Nenot, who was so thoroughly qualified, according to the Heraclean, to tell me about Heraclee. The architect of the Sorbonne, who perfectly understands the value of proportions, has reduced those of the famous scheme to their just measure.

" 'It is true that we want to found a sort of colony—a group of villas for a corterie of friends—on the Cote d'Azur, behind the islands of Hyrere. For my own part, I could wish that we might remain a little colony all by ourselves. Don't speak of such a thing as a wholesale invasion. Nothing could be more unfortunate than that!

" 'The thing we must especially avoid at Heraclee is architecture. We want no columns, no pediments, no lintels. I recommend very simple houses, in the antique style, in keeping with the landscape and the climate. I forbid the Norman, which is wholly out of place on those sunny shores. I should be pleased by the adoption of the picturesque and comfortable rustic houses of Capri or of the little Greek cities; white walls with well-placed window-openings and no balconies; terraces, as in the Orient, before the entrance, and a pergola in the Italian style. The rooms should be spacious, not too high, and with a friendly look of hominess. The walls should be thick, so as to temper the rigor of the seasons. Finally the houses should be homogeneous. I have drawn the plans for my own house and that of a friend of mine.

"'I don't want telephones or electricity. The railroad is about two miles and a half away; I hope it will stay there. We shall not be tempted to hurry at Heraclee. We shall live for the sake of living.

"'I shall spend by declining years there, and there I shall lay me down to die. Like the old men in "Faust," we shall watch the ships sail past; but, happier than they, as we gaze upon the all but Grecian blue of the sea, we shall fancy that now and then we're catching sight of Ulysses's white sails.

"'At present the surroundings of Heraclee are an unbroken desert; you may walk twenty miles along the beaches without meeting a living soul. The whole district is abandoned, and you would never imagine that a city flourished there in the twelfth century. And yet it was a favorite watering-place, like Baise, in the days of the Empire, and land was then as dear as in the Boulevard des Italiens, costing 4,000 francs a metre.

"'On the site of my future house are the remains of a Roman villa. I intend to excavate them. As for that, a good gentleman from Lyons has got ahead of me; he touched off a dynamite cartridge under the soil and the explosion strewed the surface with coins and medals. He made presents of them to all his friends—except me!

"'The land is rich in memories; also in fertility. The varied vegetation proves that conclusively.

"'Now, you see, we've nothing to do but build our villas. The city will come later. I shall make my plans for it on the spot, and in the sunshine of that lovely shore. Like the villas, the city will be of the Midi style of architecture—without ornament. Everything will be sacrificed to comfort and simplicity. The streets and avenues will avoid the right-angle regularity of modern thoroughfares and their graceful curves will be a delight to the eye.'

"Rejecting the gifts of civilization, the Heracleans will return to the primitive life of peoples more artistic than scientific. A city without railroads, without electricity, without telephones and without automobiles will be so absolutely exceptional that—if ever it is built—the whole world will want to visit it. Our artists will no longer have it all to themselves. Will they raise an army to defend their gates? In our day the founding of a city involves numberless unforeseen difficulties. And I may add that the project encounters a lot of scepticism. A clever friend of mine, to whom I had described it, exclaimed: 'A city!—a city of artists!—and probably a city of old artists! But such folks can't keep peace among themselves for the space of a good dinner!'"

* * *

Relative Cost of Brick and Frame Structures

THE subject of comparative cost of erecting the walls of dwellings of brick and of lumber has developed no little discussion in the past and the topic coming up in course of conversation with a builder who was engaged in erecting a brick structure, he was asked his opinion as to the cost of the two forms of construction. He replied that he had figured it out very carefully before deciding what material he would use in the construction of the building upon which he was then at work and his figures showed that the cost for lumber to frame his walls, sheathing, building paper, weather boarding, etc., and the lath on the inside footed up more than it would cost for brick to build the same walls. After the walls were erected, however, he found it cost more to put up the walls than it would to have employed carpenters and erected frame walls, the difference in the cost of doing the work wiping out the saving in the cost of material by using brick. This, it might be remarked, was in a clay section of the country, where brick are produced at a very low figure.

Terra Cotta and Brick

Different Kinds of Brick

By W. E. DENNISON, President Steiger Terra Cotta Works

BRICKS have had so much to do with permanently marking the promontories that carry the beacon lights of history, their very name has become a synonym of strength, endurance, security and confidence. They have proclaimed these attributes to the music of the trowel through all the ages and to so many different races as to suggest their classification, not according to shape or composition, but with reference to their language.

Even as no man's education is considered complete without some mastery of the tongues no longer spoken, so to-day few buildings designed for permanent use and enjoyment are constructed without the main protection afforded by the classic common brick. Tenacious as the early geographers were in their belief that the earth was flat, bounded by a limitless ocean, and the eloquent African astronomer in his dictum that "the sun do move," so we moderns are confirmed in the belief that the car of progress was never more impressively paraded than by us. We seldom now allow the classic common brick to be seen in our best structures. Even as the literature of to-day banks the somber tones of Homer and Herodotus behind the brilliant covers of Ben Hur and The Light of Asia do we hide the common brick with creations such as are illustrated in this and the January number of Terra Cotta Topics.

And this brings us to consideration of the bricks which record more and more perfectly the architectural thoughts of to-day. More than this, they speak a various language. To the clay worker they bring with impressive introduction the genius of modern invention and forever relegate to the dust of oblivion the wooden moulds of Pharoah's workmen.

The term **Pressed Brick** is used to distinguish all clay bricks used for the facing and finishing of the building from the common bricks used for the backing. They may be either plain square or moulded shapes. They are made by two processes, one known as the mud and the other the semi-dry process. Whether the manufacturer employs one or the other process, he must observe the same rules to a certain point, which are as follows: The clays must be dug and stored under cover in open sheds from one to two years before use if the best results are to be obtained. They thus go through the weathering process. They are then blended with sand and other materials in proportions varying according to the color and texture of brick to be made and ground in a dry pan or other mill suitable for thorough pulverization. The dry pan is circular, about nine feet in diameter and one foot deep. Its bottom consists of an outer band of slotted steel screens surrounding an inner circle of solid steel plates upon which roll two large steel-rimmed wheels or mullers

supported on arms extending from a shaft standing upright in the center of the pan. This shaft engages driving gears at the top, causing it to revolve and drive the mullers rapidly around the inner circle of the pan, thus crushing the materials thrown into the pan. As soon as the material is of the requisite fineness it drops through the screens into a hollow space, called the "boot," under the pan, whence it is picked up by a bucket elevator and carried to overhead bins and there held until needed.

At this point the methods of the mud and semi-dry process diverge. We will follow the mud process first. The pulverized clay from the storage bin is dropped through a chute into a large mixer which can best be described by likening it to a giant sausage machine. An attendant allows a jet of water to pour into the machine and mix with the clay which is violently agitated by steel knives placed propeller-blade fashion on a horizontally revolving shaft. The clay properly tempered is forced out through a die on the end of the machine in a square column and is carried along a table composed of wooden rollers closely placed together. A few feet from the discharge end of the auger machine is placed the cutting table which is a frame carrying tightly strung piano-steel wires so spaced that when the frame is made to descend suddenly by hand power or automatically by steam power the wires pass through the clay column cutting it into brick dimensions. These green bricks are placed on wooden pallets and stacked up to dry for a day or two, according to the temper of the material, for the purpose of so stiffening the bricks that when they are placed in the power-driven machine known as the re-press, there will be no tendency for the clay to squash out of the steel moulds when the heavy pressure is applied. In the re-press the mud brick manufacturer gives his brick its final shape, finish and whatever impress he desires. From the re-press he must again remove his brick on pallets and stack them up to dry until ready for the kiln.

In the semi-dry process the pulverized clay is conveyed automatically to a steaming chamber where it passes over screens accomplishing minute separation and a slight accumulation of moisture. Thence it falls through a chute to an automatic press of such heavy construction and compounded leverage as to deliver a pressure of over 25 tons to each brick. The material, if taken from the chute as it is being delivered to the moulds of this press looks like meal and the moisture in it is scarcely perceptible, yet when it is thrust onto the delivery table of the press as a finished brick its density is such as to give to the face of the brick a lustre of glass. The bricks thus made have such a minimum amount of moisture that they do not have to be taken to a dry room to be cured, but are borne on spring-bearing trucks directly to the kiln and set ready for the firing.

In the modern art of brick making where cheapness, perfection and the maximum output are desired either one or the other of these processes is employed. Hand-made bricks are but a memory in this country, than which no country in the world to-day can show greater advancement. All common brick are made by the mud process. There are two kinds, called the "soft" and "stiff," the former using more water than the latter. A few of the manufacturers of face or ornamental pressed brick still cling to the stiff mud process, but a large majority, we believe, use the semi-dry process because of its obvious advantages.

If the reader would become more familiar with this modern art whose epoch has not yet seen more than thirty years of life and is destined to leave a greater impress upon the world's architecture than the combined efforts of all the clay workers from the time of Asychius down to the centennial of America, let him visit a first-class brick plant operating the semi-dry process and see the range of colors produced by fire in its action on the various blends of California clays. He will see a few of the first letters of that myriad

alphabet of colors which spells the doom of every brick relying upon any mordant other than fire to fix its particular shade.

As the physicist looks through his glass prism at a beam of light produced by a color and the prism separates or spreads out in order, according to their refrangibility, all of the different colors of which the beam is composed, so the scientific clay-worker of to-day is able to see the spectra of his clays through the scope of his kiln fires and to produce any color of brick that the architect may desire.

* * *

Hollow Terra Cotta for Country Buildings

By GEORGE E. WALSH, in Carpentry and Building

BUILDING laws of our cities demand more or less fire proof construction of houses, so that the use of brick, terra cotta, concrete and steel skeleton frame work have become the chief materials for architects and builders; but in the country frame houses of wood are not only permissible, but the most popular. Nevertheless, owing to the great fire losses and high insurance rates, the tendency to build with fire proof materials is rapidly growing even in the rural districts. This movement limits the use of wood more to the interior trim and for such exterior ornament as piazzas, pergolas and similar features of the modern country home.

The questions of cost and artistic effects have always been potent in deciding the general nature of house construction. Formerly the cost of fire proof construction was so much in excess of wooden frame construction that it had little chance to compete with it, but this difficulty has been largely removed in recent years by the reduction in the cost of fire proof bricks, hollow terra cotta building blocks, concrete building blocks and other structural materials. Lumber has advanced in price in almost direct proportion to the cheapening of fire proof materials. This fact has driven many to consider the value of the new construction materials.

Architects who formerly found it easier to work in wood have demonstrated their ability to design country homes of great beauty and artistic effects with fire proof materials. It is no longer considered impossible to produce a country home of brick, stone and terra cotta in perfect harmony with rural surroundings; and types of this class of houses are multiplying in all parts of the country. The remarkable popularity of hollow concrete building blocks is typical of the new movement. Thousands of country houses are being constructed of concrete blocks, with only such use of wood as deemed necessary to give a perfect finish to the interior and exterior.

The use of hollow terra cotta building blocks is older in our cities than concrete blocks, and most of the large hotels, apartment houses, skyscrapers and public buildings are composed of this material. With iron skeleton frame work to carry the load up to almost any height desired the work of protecting it inside and outside with porous hollow terra cotta blocks has been simple and effective. A fire originating inside or outside of such a building has little chance of warping the metal or spreading from one room to another.

The adaption of this form of construction to isolated country homes marks a comparatively new departure. While recognizing the value of fire proof clay for building purposes, architects and builders have met with the obstacle that a good deal of iron frame work is needed to give the buildings strength and rigidity. This so materially added to the cost of the country

Entrance Gateway to Los Portales, Bakersfield, Residence of Mr. W. S. Tevis C-395
Henry A. Schulze, Architect

Reading-Room in Natural Sciences Building, Stanford University. Henry A. Schulze, Architect C-396

buildings that few cared to undertake the work. Not until a type of houses could be designed which could be built without the iron skeleton work was it possible for burnt clay tiles, bricks and blocks to become popular.

The development and improvement of building materials in this particular have largely removed this objection. It is possible to use terra cotta materials and hollow burnt clay blocks so that country homes can be put up at little more cost than for a wooden structure, and without the use of iron frame work. A number of structures of this type are springing up in many parts of the country and a study of some of their features is particularly valuable. Walls, partitions, roofs and ceilings are constructed of terra cotta blocks, so that the houses are not only fire proof but well protected from vibration, vermin and excessive changes in temperature. They are more durable than almost any other class of structures erected, and, like the skyscrapers of our cities, they promise to last for centuries without any great deterioration. They possess certain other advantages, such as proof against the action of weather, and thus need no painting and periodic repairs, and much cheaper to insure against fire.

One of the most recent illustrations of the modern buildings in which fire proof materials are used without iron skeleton work for supporting floors and roofs is the new Madison Avenue Presbyterian Church. The walls of this structure are of brick and hollow terra cotta blocks, and the roof consists of a great dome over 50 feet in diameter which springs from the walls without metal support of any kind. The arched dome is built up of fire proof clay tiles averaging 6 x 12 inches, laid in courses of cement, and designed so that the keystone of the arch carries the whole load. There is not a particle of metal used for sustaining this great dome, and yet it is so perfectly fire proof that no interior fire could damage the roof or affect it in any way.

The modern terra cotta or clay tiles are burnt in kilns to a temperature of from 2000 to 2500 degrees F., and as a result of this form of manufacture it is impossible for them to be affected by the hottest fire that is likely to rage in a building, even when fed by highly inflammable material. Up to this high temperature the tiles or blocks do not warp, crack or sag. Consequently when used as floors, roofs, partitions or ceilings they restrain the spread of an interior fire.

The question of strength is the next important consideration for a builder or architect. In building the new domes and arches of fire proof tiles the cohesive strength or resistance to shearing of two hard tiles cemented together with good Portland cement is equal to 124 pounds to the square inch. The tiles are made as hard as the cement, and when made into the form of an arch the two become a homogeneous whole. But the arches are built up of several courses, so that resistance of over 2000 pounds to the square inch is obtained.

But the modern fire proof tile arch is not of so much value to the builder of the country house as the flat arches made of hollow terra cotta tiles reinforced with steel wires inbedded in the materials. The wire reinforcements carry the load and the floor or ceiling of tiles is laid on top of it. The basis of the flooring is formed of large steel wires transversely interwoven with still larger wires placed 4 inches apart. Over and through these wires the cement is placed and the tiles set longitudinally until a complete monolith or homogeneous floor is formed. The wire truss reinforcement is cut according to measurements and shipped in reels, so that a builder or contractor can easily put it in position. Every part of the metal is protected by cement mortar or fire proof clay tiles from any exposure to fire. The result is a perfect floor or ceiling is formed without the use of steel frame work, which in case of fire would resist high temperatures as much as a floor of a modern fire proof skyscraper in our cities.

Entrance Gateway to Los Portales, Bakersfield, Residence of Mr. W. S. Tevis C-395
Henry A. Schulze, Architect

Reading-Room in Natural Sciences Building, Stanford University *Henry A. Schulze, Architect* C-396

buildings that few cared to undertake the work. Not until a type of houses could be designed which could be built without the iron skeleton work was it possible for burnt clay tiles, bricks and blocks to become popular.

The development and improvement of building materials in this particular have largely removed this objection. It is possible to use terra cotta materials and hollow burnt clay blocks so that country homes can be put up at little more cost than for a wooden structure, and without the use of iron frame work. A number of structures of this type are springing up in many parts of the country and a study of some of their features is particularly valuable. Walls, partitions, roofs and ceilings are constructed of terra cotta blocks, so that the houses are not only fire proof but well protected from vibration, vermin and excessive changes in temperature. They are more durable than almost any other class of structures erected, and, like the skyscrapers of our cities, they promise to last for centuries without any great deterioration. They possess certain other advantages, such as proof against the action of weather, and thus need no painting and periodic repairs, and much cheaper to insure against fire.

One of the most recent illustrations of the modern buildings in which fire proof materials are used without iron skeleton work for supporting floors and roofs is the new Madison Avenue Presbyterian Church. The walls of this structure are of brick and hollow terra cotta blocks, and the roof consists of a great dome over 50 feet in diameter which springs from the walls without metal support of any kind. The arched dome is built up of fire proof clay tiles averaging 6 x 12 inches, laid in courses of cement, and designed so that the keystone of the arch carries the whole load. There is not a particle of metal used for sustaining this great dome, and yet it is so perfectly fire proof that no interior fire could damage the roof or affect it in any way.

The modern terra cotta or clay tiles are burnt in kilns to a temperature of from 2000 to 2500 degrees F., and as a result of this form of manufacture it is impossible for them to be affected by the hottest fire that is likely to rage in a building, even when fed by highly inflammable material. Up to this high temperature the tiles or blocks do not warp, crack or sag. Consequently when used as floors, roofs, partitions or ceilings they restrain the spread of an interior fire.

The question of strength is the next important consideration for a builder or architect. In building the new domes and arches of fire proof tiles the cohesive strength or resistance to shearing of two hard tiles cemented together with good Portland cement is equal to 124 pounds to the square inch. The tiles are made as hard as the cement, and when made into the form of an arch the two become a homogeneous whole. But the arches are built up of several courses, so that resistance of over 2000 pounds to the square inch is obtained.

But the modern fire proof tile arch is not of so much value to the builder of the country house as the flat arches made of hollow terra cotta tiles reinforced with steel wires inbedded in the materials. The wire reinforcements carry the load and the floor or ceiling of tiles is laid on top of it. The basis of the flooring is formed of large steel wires transversely interwoven with still larger wires placed 4 inches apart. Over and through these wires the cement is placed and the tiles set longitudinally until a complete monolith or homogeneous floor is formed. The wire truss reinforcement is cut according to measurements and shipped in reels, so that a builder or contractor can easily put it in position. Every part of the metal is protected by cement mortar or fire proof clay tiles from any exposure to fire. The result is a perfect floor or ceiling is formed without the use of steel frame work, which in case of fire would resist high temperatures as much as a floor of a modern fire proof skyscraper in our cities.

Relative Strength of Spans.

The relative strength of such floor spans is greater than ever required for ordinary houses, and the span can extend to 25 and more feet by increasing the tile and reinforcement. In tests with live loads a span of 16 feet between girders has carried 733 pounds to the square foot, or a total of 187,680 pounds on the whole floor. By dispensing with steel beams a great saving is obtained. This method of building has been adopted in many city structures, notably the Chicago Post Office, where heavy loads must be carried. The metal is so imbedded in the cement mortar that it is impossible for it to rust and deteriorate, and its life is as long as the building materials which it supports.

With the flooring or ceiling once formed, the finish can be made in wood, tile or mosaic work or gravel, with suitable roofing material. Wooden beams can be laid on top of the tiles and wooden floors nailed to them in the old way, or plastic materials which give a firm, hard, fire proof floor can be employed. The ceiling can be finished in the ordinary way or with stamped metal ceilings. Even should the latter be warped and melted by a hot interior fire it would not affect the strength of the floor, for the latter is built independent of it, and with every part of the metal inclosed in cement at least 1 inch thick.

The walls of such a building are composed of 8, 10 or 12 inch hollow tile blocks. The metal reinforcements are imbedded in the outside brick walls, so that almost any requirement of a house can be met. Where mills, factories or storage houses use this system of floors iron columns are employed for attaching the reinforcements, but an ordinary country house demands no such strength in its floors. The walls of the house are built of any desirable bricks, plain or faced, and one course of plain hollow terra cotta blocks inside of the walls for fire resisting purposes. This course of hollow blocks meets with and is joined to the blocks of the floors and partitions. In this way each room becomes a fire proof box, in which any interior fire could be confined. The hollow tiles for interior of walls are made with rough faces for wall furring, so that the ordinary plaster can be used.

Ordinary terra cotta partitions can be laid by the bricklayer, but the best Portland cement must be used, so that when it hardens it will be as firm and fire resisting as the tiles or blocks. The porous terra cotta blocks are manufactured for interior use, so that nails can be driven in them. By means of this the interior trim of wood can be nailed to the walls or base. The interior of the porous blocks is furred for receiving plaster or left smooth for paint and whitewash or enamel. Enameled and tinted fire proof clay tiles for interior decoration have been employed in the main ceilings of the first floors of the new Tiffany and Gorham buildings in New York and their effect is very striking. They illustrate a new departure in this use of tiles. The colors and glazing are burnt into the tiles after designs made by the architects, and no amount of dirt, grease or smoke can injure them. An annual washing is all that will be required to keep them in a perfectly fresh and sanitary condition. Similarly in country homes such tiles can be exposed for artistic as well as useful effects.

Partition Tiles.

The terra cotta tiles used for partitions are usually 8 x 8 or 12 x 12 inches, with the thickness adjusted to suit special cases. The partitions are usually 3 to 4 inches thick. The blocks are set up on end, except the top course, which is placed on the side to give a finish. In some of the higher priced country homes of this character the brick walls are lined with fire proof clay tiles inside and outside. The outside course is of more dense material than the inside

and is hard burned, with smooth surface. The protection of the bricks from disintegrating effects of weather is thus so great as to increase the durability of the building from 10 to 20 per cent.

There is another use of hollow fire proof clay products that has many advantages. They are sometimes laid on wooden beams which are strung across from brick walls to carry the load. A 3 or 4 inch course of hollow blocks protects the wood from fire up to a temperature of nearly 1000 degrees. After that, in spite of the nonconducting qualities of the terra cotta, the wooden beams might char and fall. The under parts of the beams are protected by 2-inch ceiling blocks secured by means of screws and washers. In this case the fire can cause no damage until the metal screws and washers melt or warp and thus loosen the blocks. This method of structure has been approved by many city building commissioners, so that walls and ceilings are rendered comparatively fire proof.

Fire proof clay building blocks and tiles are the lightest of all materials of this class, and the additional load which they give to a floor supported by wooden beams is very inconsiderable. A cubic foot of terra cotta hollow tile weighs about 40 pounds, while the lightest cinder concrete suitable for floors and arches weighs upward of 90 pounds. A wooden floor composed of thin maple strips of flooring, spruce sleepers and plastering would weigh nearly half as much as a floor composed of wooden beams with an under course of hollow tile blocks and an upper one of the same material. Where reinforced metal trusses are used the difference in the weight is slightly increased.

The whole question of adapting burnt clay products to house construction in the country is one of cost, durability, strength and beauty. The cost has been so materially reduced in recent years by the introduction of labor saving machinery that it is almost on a par with wooden construction. In special localities fire proof clay tile houses have been built at the same estimated cost demanded for wooden frame structures. There is no question about the greater durability of the terra cotta house nor any doubt about its fire proof advantages. The strength of floors and arches without the use of iron beams and girders has likewise been satisfactorily solved in the last few years. The tests given have been made to meet requirements of city laws, which are much more stringent than those in the country districts.

* * *

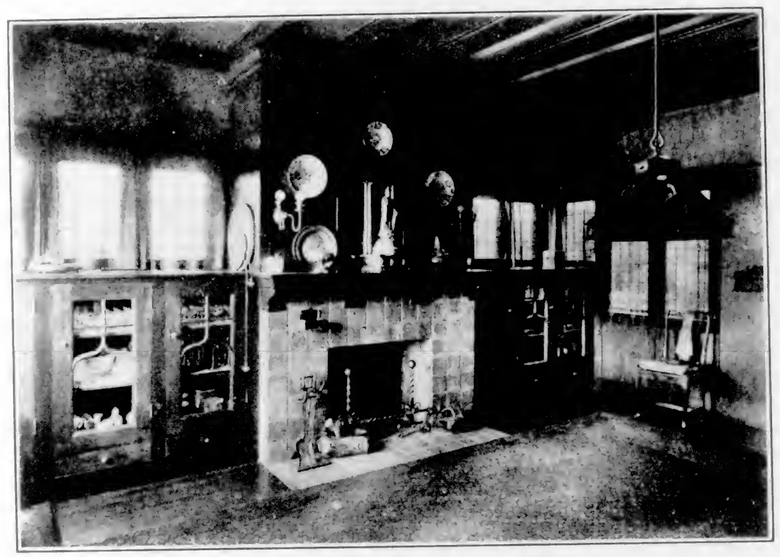
The Universal Building Material*

By F. W. FITZPATRICK

FROM time immemorial has gold been the standard of value, the basis of monetary system, the most precious and esteemed of metals in ordinary use in all civilized nations; so has burnt clay generally represented the highest standard, the perfection of the craftsman's art of building, and so is it generally accepted as the most indubitable, authentic and best preserved record of the history of past times. True, patriots—misguided or otherwise—have tampered with this standard, too, have sought to put baser materials on a par with it, have endeavored to write history on stone and marble, and, even for long periods, have they succeeded in placing the art of clay modeling and baking in the limbo of oblivion; but, phoenix-like—to use a much hackneyed term—it has always risen, not from its ashes, because you cannot reduce it to ashes, but from the "slough of despond" as it were, in a glorious renaissance, to its own high natural and legitimate estate.

*Read at the Brickmakers' Convention, January, '06.

Library in Residence of Rudolph and Hugo Taussig *Edgar A. Mathews, Architect* C-397
Panel Decorations by Mr. Arthur F. Mathews



Dining-Room in Residence of Rudolph and Hugo Taussig *Edgar A. Mathews, Architect* C-398

We find sun-baked bricks in Egypt, Assyria and the older towns of India that must be at least 3,000 years old. And year by year new excavations reveal to us that brickmaking was know long 'ere that period. In the ruins of Babylonia we find kiln baked brick of most excellent make and shape, even enameled and ornamented. Rome built much of brick and introduced the art into England. Flemish workmen continued the work begun there by the Romans, but we find no record of brick being made by the proverbially slow but sure Englishman prior to 1260. Naturally brickmaking reached its perfection in lands where stone was uncommon.

As naturally, in far remote times, where it was at all procurable, timber was mostly used in building the rude shelters of men; then stone was roughly shaped and made to do duty, there where great permanency was desired, for the parts that had formerly been of wood, and there, for instance, we have the origin of the column and the lintel. In places where stone was difficult to secure, and possibly timber, too, brickmaking was resorted to, at first as a mere substitute for stone, and later as a preferable medium of expression and construction. It was found that the parts, the units being small, were easily handled and constituted a building material far more adaptable to the necessities, the varying purposes, particularly of people peaceful in their ways and not blessed or cursed with slave labor. Ornamenting the surfaces, enameling in beautiful colors, were natural steps in the development of the art that was brought to very high perfection in Assyria and Persia.

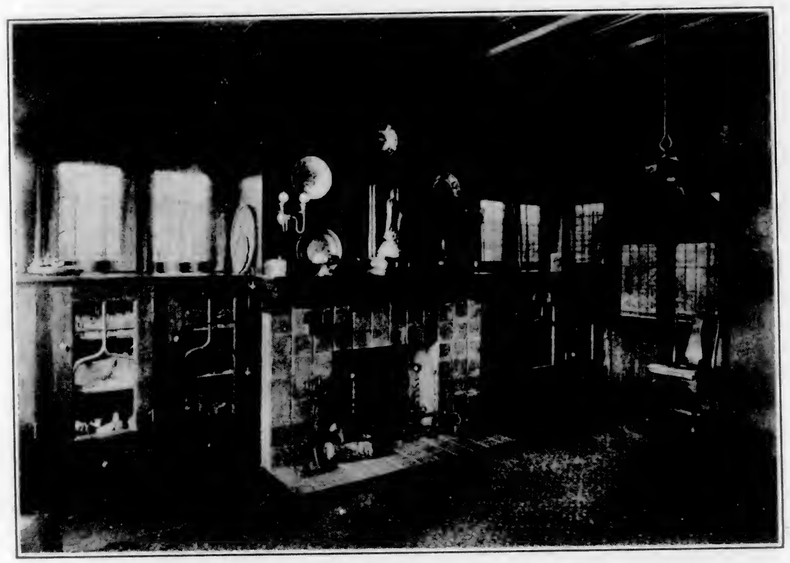
The Christians borrowed that art and applied it with success in their new capital in Byzantium, where, under the Emperor Brazil, it reached its very apogee. Later still, the followers of Mahomet, at first, rude barbarians and despoilers of everything artistic, little by little fell under the sway of oriental art and began to use burnt clay in all its varied forms themselves. With Persian artists in their midst, Constantinople their headquarters, India, their storehouse, and fresh art treasures and libraries and masters falling into their hands every day, they could not long withstand the pressure. From brutal barbarity they became protectors, defenders, patrons, nay, very masters of the arts and sciences! Persian art then became Arabian art—by right of conquest. The followers of Mahomet still carried the sword and ruled by it; but then, the highest civilization was also carried along by them and we have them to thank for the preservation of the ceramic art to our time.

I say "preservation" of the art advisedly. They gave us store-houses of it, as it were, for it has been preserved in that sense alone. It has been shelved for ages, or, if used at all, merely as a plaything and only to-day is it being really revived and applied largely, coming into its own again and taking its place among the greatest works of man.

In England brick, terra cotta and pottery and tile were quite a little in vogue in the beginning of the eighteenth century, but after Queen Anne, there was a reversion to baser forms; wood and plaster predominated, and even in this country we still see perpetrations, awful nightmares, doing duty under the guise of "Queen Anne" cottages, a synonym for anything that is too ugly to have any other name.

Here in the United States we have never had what might be called an era of burnt clay. We have only comparatively recently acquired great skill in that art. Up to a very short time ago, men built here with anything they could get easily and cheaply. We have had a galvanized iron era, a gingerbread wooden work era, concrete block crazes and all that sort of thing, but the popular prejudice has always been that when a man could afford to set rigid economy aside, then granite, marble and stone were the proper expressions for his building. Those materials exemplified, typified wealth, taste and culture. Brick and terra cotta were used where cheaper substitutes became

Library in Residence of Rudolph and Hugo Taussig *Edgar A. Mathews, Architect* C-397
Panel Decorations by Mr. Arthur F. Mathews



Dining-Room in Residence of Rudolph and Hugo Taussig *Edgar A. Mathews, Architect* C-398

We find sun-baked bricks in Egypt, Assyria and the older towns of India that must be at least 3,000 years old. And year by year new excavations reveal to us that brickmaking was know long 'ere that period. In the ruins of Babylonia we find kiln baked brick of most excellent make and shape, even enameled and ornamented. Rome built much of brick and introduced the art into England. Flemish workmen continued the work begun there by the Romans, but we find no record of brick being made by the proverbially slow but sure Englishman prior to 1260. Naturally brickmaking reached its perfection in lands where stone was uncommon.

As naturally, in far remote times, where it was at all procurable, timber was mostly used in building the rude shelters of men; then stone was roughly shaped and made to do duty, there where great permanency was desired, for the parts that had formerly been of wood, and there, for instance, we have the origin of the column and the lintel. In places where stone was difficult to secure, and possibly timber, too, brickmaking was resorted to, at first as a mere substitute for stone, and later as a preferable medium of expression and construction. It was found that the parts, the units being small, were easily handled and constituted a building material far more adaptable to the necessities, the varying purposes, particularly of people peaceful in their ways and not blessed or cursed with slave labor. Ornamenting the surfaces, enameling in beautiful colors, were natural steps in the development of the art that was brought to very high perfection in Assyria and Persia.

The Christians borrowed that art and applied it with success in their new capital in Byzantium, where, under the Emperor Brazil, it reached its very apogee. Later still, the followers of Mahomet, at first, rude barbarians and despoilers of everything artistic, little by little fell under the sway of oriental art and began to use burnt clay in all its varied forms themselves. With Persian artists in their midst, Constantinople their headquarters, India, their storehouse, and fresh art treasures and libraries and masters falling into their hands every day, they could not long withstand the pressure. From brutal barbarity they became protectors, defenders, patrons, nay, very masters of the arts and sciences! Persian art then became Arabian art—by right of conquest. The followers of Mahomet still carried the sword and ruled by it; but then, the highest civilization was also carried along by them and we have them to thank for the preservation of the ceramic art to our time.

I say "preservation" of the art advisedly. They gave us store-houses of it, as it were, for it has been preserved in that sense alone. It has been shelved for ages, or, if used at all, merely as a plaything and only to-day is it being really revived and applied largely, coming into its own again and taking its place among the greatest works of man.

In England brick, terra cotta and pottery and tile were quite a little in vogue in the beginning of the eighteenth century, but after Queen Anne, there was a reversion to baser forms; wood and plaster predominated, and even in this country we still see perpetrations, awful nightmares, doing duty under the guise of "Queen Anne" cottages, a synonym for anything that is too ugly to have any other name.

Here in the United States we have never had what might be called an era of burnt clay. We have only comparatively recently acquired great skill in that art. Up to a very short time ago, men built here with anything they could get easily and cheaply. We have had a galvanized iron era, a gingerbread wooden work era, concrete block crazes and all that sort of thing, but the popular prejudice has always been that when a man could afford to set rigid economy aside, then granite, marble and stone were the proper expressions for his building. Those materials exemplified, typified wealth, taste and culture. Brick and terra cotta were used where cheaper substitutes became

necessary! Only now are our people beginning to realize the infinite possibilities of burnt clay and that it has a character all its very own, a distinct personality, an exalted one, and typifies that which is the most perfect, the most durable and yet the most elegant, plastic and yielding material known to the builders' craft. To-day, at last, rich men use it as a matter of course, because they want it and appreciate it, not as did those of yesterday, merely because it does cost less money than granite or stone.

And yet, with us, must as we know about it and however well we do it, that art is in its very infancy. Its possibilities are endless, the field before us absolutely unlimited.

When I say that the art is in its "infancy," I must qualify that term. The infant is, indeed, a lusty one. We have made wonderful strides and, unlike most infants, we have profited by the experience of other countries and other times. Though we admit our extreme youth, we have picked up the art and are continuing it from where others left off, and we are not going over the whole process of growth, as most infants do. No country on earth makes better or handsomer bricks than we do; our enameled bricks are the equal of any; our terra cotta surpasses in beauty and perfection that made by any other people at any other time. Why, the Winkle exhibit at the St. Louis Exposition taken alone, without considering any of the other beautiful works there, was sufficient to place us in the foremost rank of modelers and craftsmen, shoulder to shoulder with the makers of terra cotta in any other time or clime. It spelled perfection. Let the dust and mellowing influences of time touch it here and there and you will have people raving over it as they do now over Della Robia. And our pottery cannot be classified far down the line.

Another thing this country has done in the matter of burnt clay of which we are justly proud. Here, some thirty years ago, was devised the first hollow tile building block for floor and partition construction. It came as an experiment, but in the thirty years that have followed it has not fallen short of the promise made for it then. It has stood the brunt of crushing strain and terrible fire, and that it has made a place for itself and is an accepted factor, not only in the art of burning clay, but is a most important and essential factor in modern construction, is proven by the fact that there are already 700,000,000 square feet of it in place in this country to-day!

Just now there is being waged something of a puny warfare against burnt clay in all its forms by the advocates of concrete construction. Now, no man is a firmer believer in concrete—in its proper place—than I, and, few, indeed, have used more of the material, but I tell you some engineers and the producers of cement have gone concrete-crazy. They advocate it as a penacea for all ills, the one material to be used under all conditions and to the absolute elimination of all else. They gabble to us to-day about hollow concrete blocks for exterior work, slab concrete floors and partitions for interior work, concrete everywhere. And they tell us that it is but a revival of the old Roman construction that was so perfect and that has stood so long. You will hear the learned engineers constantly prating about the splendid dome of the Pantheon at Rome, the greatest piece of vaulting that was ever done, as the apotheosis of concrete construction. Bless you, the main ribs of that magnificent vault are built, not of concrete, not of stone, not of steel, but of a far more perfect material, BRICK. The whole thing is essentially a brick construction with concrete filling between those brick ribs merely forming the sunken panels of the ceiling. The Romans did do some very important concrete work, however. They certainly used very wide spans in their floor construction. In that respect our concrete friends of to-day, with all their vaunted engineering ability, are far more modest than were their predecessors under the Roman Emperors. But, then, conditions of our civilization would not permit

of the old time temerity. We wouldn't stand for the loss of life that was quite permissible in those times. To-day great commotion is made whenever there is a concrete collapse in which one or two poor workmen are killed, and Heaven knows such collapses are frequent enough. In the time of the Emperors slave labor was used, and a few hundred poor devils, more or less, was not a matter of grave importance, though we do find it recorded that Vitruvius, the famed military engineer of Augustus' first epoch, protested vigorously to his Emperor against the practice of building with concrete on account of the resulting accidents to and deaths of a great number of slaves, and he recommended the use of brick, in part or entirely, in place of concrete, as a better material and as far more merciful to humanity.

One of the theories advanced by our concrete friends in support of their concrete blocks and other forms of construction is that it is cheaper than burnt clay. One way to make it cheaper is to use, as nine-tenths of them do, unskilled labor. It is the contest between rude material and unskilled labor, with masses of greater volume and weight on one side, and on the other selected material and skilled labor, with masses of less volume and less weight. Take your choice.

There are a thousand legitimate ways of using concrete. It is admirable for foundations of buildings, fillings of piers, railroad work, bridges, subaqueous work, anywhere used in compression and in masses, and where it is not exposed to intense heat. But when you come to use a thin slab of it twenty feet or more in span, for flooring purposes, you are incurring great peril indeed. 'Tis no better than a slab of stone the same size, and a flaw in it is just as possible as in the stone; more so, for less skillful artificers have fashioned it, and where there is a flaw there is weakness, and the whole is but as strong as its weakest part; the folly of building of large units and using unskilled labor to make them! Folly? I call it a crime.

One-half the trouble is that the cement producers are ravenously clamoring for a new market and care not one whit how cement be used, provided they can sell it. There is danger that they will work out the construction of a most useful material by abusing it and incurring popular disfavor.

They claim for the construction that it is essentially "fire proof." The highest authorities tell us, and our everyday experience proves to us the incorrectness of the statement, that even when Portland cement is properly made its fire-resisting qualities may be considered to 600 degrees, but when subjected to subsequent drenching, the result is disastrous. Why, 600 degrees is no heat at all for a fire. At extremely high temperatures concrete will disintegrate, just the same as will limestone, or granite, or marble. And yet they wish to put those materials in comparison with brick as fire-resisting! Did you ever hear and see granite and limestone and marble in a fire? It all steams and pops and explodes and goes to pieces in a Fourth-of-July like celebration. Concrete makes less noise about its disintegration, particularly if water be thrown upon it, is far more insidious and is just as complete. The worst feature about it is that they persist in exploiting "cinder" concrete, naturally because it is cheaper, and "cinders," the country over, is a mere synonym for ashes, and when mixed with cement is just so much mud.

What was it that stood the test of the Baltimore fire, was it granite, or stone, or concrete? What has become of three little and much-vaunted examples of concrete construction there? No, it was the tall brick and tile fireproof structures that withstood that awful test. And they were only commercially fire-proof at that, built at the minimum cost and, in most cases, years ago when comparatively little was known about fire-proof construction, yet those are the structures which stood up, that suffered only 7 to 10% in their structural parts and that literally saved Baltimore, for had it not been for that

splendid bulwark of brick buildings the fire would surely have had a clean sweep for miles. Aye, and perhaps the entire city might have been laid in ashes.

They are giving us hollow concrete blocks as something new. They were quite commonly used forty years ago and were then, as now, called "fire-proof." But the Chicago fire of '71 demonstrated beyond peradventure the inefficiency of concrete as fire-proofing and clearly established the superiority of burnt clay over all known structural materials. And Baltimore but corroborates that experience. Burnt clay has stood the test of time and fire and water, and since the era of tall buildings it has been used in over 90% of them. You seldom hear even a concrete man offering any criticisms of burnt clay. No, he but loudly proclaims that he has something cheaper, and, if he is very daring, "equally as good." The very best of concrete is made with Portland cement, slag, crushed clinkers, or real, completely corbonized, stem cinders, or broken bricks or tile, and in such amalgamation, and in sufficient quantities and with sufficient steel to act as a good floor or wall construction, and made by skilled artificers, it is **not** as cheap as burnt clay and never will be as fire-proof.

One objection the concrete people cite against burnt clay for building construction is that in using brick or hollow tile for floor arches, rolled steel members have also to be used, and that there is frequently great delay in procuring that steel. Thanks to Mr. E. V. Johnson, the son of the first really scientific adaptor, if not the inventor, of hollow block tile flooring, we can now put up a building entirely of brick and terra cotta, without any steel beams for the floors or steel rods for tying purposes, or steel or iron columns, an absolutely all-burnt-clay building. The same gentleman has also made it possible to use burnt clay products in lofty grain elevator bins, smoke-stacks, and that sort of construction where heavy brick walls are not possible. Indeed, we must credit him with many improvements connected with the art of clay burning.

Much ado is generally made about Underwriters' requirements and methods. Whatever the insurance people do in the way of construction is looked upon by the masses, and with some reason, as being the perfection of construction, a model to go by. The Underwriters some time ago decided to erect a model building in Chicago as a testing laboratory. All sorts of things were at first proposed. Alleged "slow-burning" wood construction (that has long been a pet foible of the insurance folks), concrete and whatnot. But thanks mostly to Mr. Johnson, the Underwriters, this time at least, built perfectly, and their laboratory in Chicago stands as a model of what ought to be done. It is built of brick and tile and terra cotta, a full-fledged, thoroughly fire-proof, one may say, all-burnt-clay building.

The National Fire Proofing Company, of which Mr. Johnson is Western Manager also maintains a very fine laboratory in Chicago. There they test not only their own products, but concrete and everything that comes to hand. Experiments in all classes of construction and all classes of material are constantly being made on a large scale, and the work being done scientifically and thoroughly is of the utmost benefit to the building trades and should receive their hearty support and co-operation. I know that the Company will be very glad to test anything in the way of new shapes of bricks, etc., that you gentlemen might wish to send them. There is no better equipped laboratory in the country, both as to testing apparatus and skilled physicists, engineers and chemists.

Speaking of laboratories and tests, that is one point about which I wish to take the brickmakers to task. You are making splendid products, but this is a progressive age. Perfect as is anything you may have, it is, in the vernacular "up to you" to strive to do still better. I believe that our brickmakers are too well satisfied. We are using the shapes and molds that our fathers did. We have Roman shapes, Flemish shapes, and the molds of a time when Romanesque and crude classic forms were in vogue, and all that sort of thing, but it strikes me that we should go beyond all that and study the exact needs that our modern problems present, and then strive to put upon the market something that will exactly fit those requirements, and not try to beat the requirements into shape to fit what you are now supplying. Take molded brick, for instance, the accepted possibilities of ornamentation in that medium are indeed limited. We should experiment and design and work and fail and try again, till we get shapes and ornaments that will fit almost anything an architect can design. We should make bricks, not only the enameled, but ordinary face brick, of any color and surface. It wouldn't take long for architects to rise to the possibilities of such things and give us splendid chromatic effects instead of the monotonous fronts we see all about us in our cities. I am sick of red buildings, of buff buildings, and of gray buildings. Give us some other key to the gamut of colors. Most of us Americans are veritable cowards when it comes to color. Why, it would pay you thousands per cent. to have some really capable designer, an artist, not mere draftsman, give his whole time and attention to the possibilities of brick, to devising forms of cornices, string courses, sills, window caps, panels, fashioned out of brick and susceptible, by merely interchanging, of endless and most beautiful combinations. The things that you have under the guise of ornamental brick to-day, gentlemen, are not worthy of you. Well as we all think you have done, you could, with your splendid American ingenuity, skill and indomitable courage, do ten thousand times better.

And so, too, with terra cotta. I said we did splendid work in that material, and we do. Beautiful modeling, mechanically perfect assemblage. But we have fallen into the way of accepting certain limitations as absolute. I am not unaware of the difficulties there are in making terra cotta, but I also know that to us Americans, difficulties simply mean things that must be surmounted. Well, then, architects very frequently object to terra cotta solely for the reason that its parts, or units, have to be comparatively small. They have been used to cornices of stone for instance, where they use lengths of six, or ten feet or even more; they are accustomed to thinking that sort of thing massive and impressive by reason of that fact. Then why on earth not give them the same thing in terra cotta, columns in one piece instead of cutting them up in short drums, wide lengths of cornices? Oh, yes, I know the objections; big pieces warp and twist and shrink and the wastage is enormous. But go ahead and experiment! Spend some of your surplus in trying new ways of handling and burning your clay; it's worth it. The man who discovers how to do it will not only make a fortune for himself, but will pass down to posterity as one of the great inventors of this inventive time. And that indeed, is honor. We have electricity, why cannot, by some means of metal bands or coils in the core, heat be uniformly applied to all parts of the clay form at once and of equal temperature? There is some way of doing it. If I knew how I would tell you. Or, if you cannot possibly make long pieces, then try and fix up the joints so they are not so conspicuous. Something can surely be done. You are not going to supinely give in and admit that they can do in stone or concrete or galvanized iron that which you cannot. Try to at least go one better. Work at it, experiment, and if you fail, why, try again! As the French say the "game is well worth the candle."

Building constitutes to-day one of the most important functions of man. Countless billions of money are being spent in construction. The work calls for the brightest and best intellects. There is no room at the top for torpor

and complacency. The Motto must be "On and Up." The place occupied by burnt clay to-day is a lofty one. That is recognized and conceded even by those most violently opposed to it, and is what hurts them most. It has reached that exalted position largely by its intrinsic merits, true, but it has taken good, hard, intelligent, earnest work to have those merits recognized, to put those very inherent qualities in tangible form, to make them of practicable utility. We must not relax in those efforts. We must not sit down and say work has been well done, we are pleased with it and will now rest. The thing is to be up and at it, hammer and tongs, shoulder to shoulder, in an earnest, persevering, well-directed effort to not only keep burnt clay in that splendid place it has reached, but to force it ever upward, by every legitimate means in our power, until it becomes in fact what we believe and know it ought by rights to be, the UNIVERSAL BUILDING MATERIAL!

I Am a Brick

By W. E. DENNISON

What am I,
That I should see my maker's clay
Within my walls entombed to-day,
And know full well a century hence
Naught else shall live to show his sense?
I am a brick.

What am I,
That men should strive on Babel's tower
To lay me up to show their power;
Displeasing God, laid down their tools;
Dispersed as history's banner fools?
I am a brick.

What am I,
Though formed of clay, have seen the end
Of countless reigns, and yet defend
My title to the oldest place
On scroll of deeds of human race?
I am a brick.

What am I,
That I should take a lowly seat,
Or sit at anybody's feet,
When I compose the pyramid?
Of would-be doers I'm still the "Did."
I am a brick.

Scene along the California Northwestern Railroad C-399

California's Garden Spot

THE approach of the vacation season starts one to thinking where he shall spend a week or more of pleasant idleness. One of the attractive spots in California is along the picturesque route of the California Northwestern in Marin, Sonoma, Mendocino and Lake counties. Valleys large and small, rolling foothills, and hills of moderate ranges well wooded, numerous creeks and rivers and lakes, fresh-water springs everywhere, and a salubrious climate, combine to make this territory an ideal agricultural one.

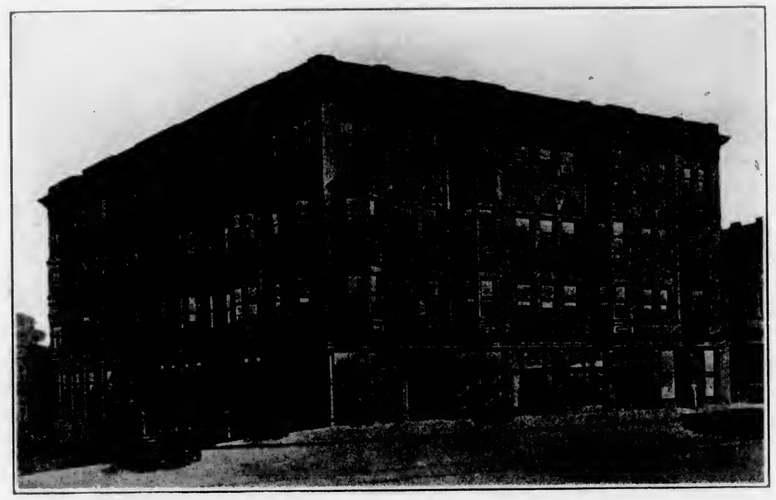
Along the western side of Sonoma and Mendocino counties lies an immense forest of redwood trees, whose towering size represents the sublimity of growth in nature.

The "Garden Spot" is reached from San Francisco, by large ferry-boats, which transport you from depot, foot of Market street, across the bay to Tiburon, a distance of six and a half miles; thence by trains of the California Northwestern Railway.

From Tiburon the main line extends to Willits, a distance of 138 miles from San Francisco, passing through San Rafael, Petaluma, Santa Rosa, Healdsburg, Geyserville, Cloverdale, Hopland, and Ukiah. From Ignacio, 23 miles from San Francisco, a branch runs through the historic and beautiful Sonoma Valley, and reaches Glen Ellen, 49 miles from San Francisco. From Santa Rosa, 52 miles from San Francisco, a branch 6 miles long runs to Sebastopol, 58 miles from San Francisco, tapping the Green Valley and Gold Ridge fruit country. Still another branch, 16 miles long, paralleling the Russian River, and tapping the "Vine Hill country," runs from Fulton, 4 miles north of Santa Rosa and 56 miles from San Francisco, to Guerneville, 72 miles from San Francisco.

Chamber of Commerce Building, Sacramento — *R. A. Herold, Architect* — C-400

Marshall Primary School, Sacramento — *C. W. Dailey, Builder* — C-401



Remodeled Capitol Hotel, Sacramento
Cornice Work by Sinclair & Bessey

Siller Bros., Builders — C-402
T. J. Pennish, Plaster Work

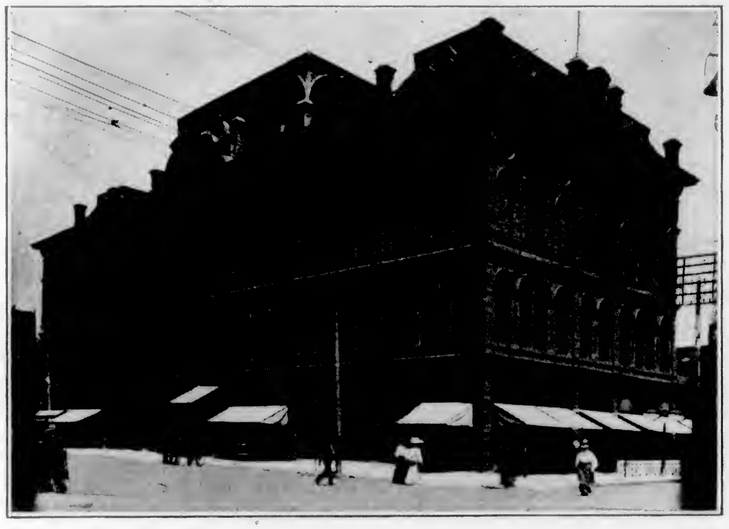
Some Sacramento Architecture

DURING the five years that R. A. Herold has been engaged in the practice of his profession in the city of Sacramento, there has been developed a long-needed reform in its architecture. The change is due as much, if not more, to the efforts of Mr. Herold as to the work of any other single builder or architect. To him Sacramento is indebted for the plans of the first modern office building, a creation that marks a new era in the city's development. His appointment by the Legislature to prepare estimates for the improvement of the State Capitol and his study of the building have made him an authority on this very important subject. Mr. Herold, although but 35 years of age, has spent half of that time in the study and practice of the profession of which he is so competent an exponent. He began his preparation in San Francisco, and later spent three years, devoted to study and research in the capitals of Europe. Five years ago he established his office in this city, and during this brief period has brought about almost a transformation in Sacramento's appearance.

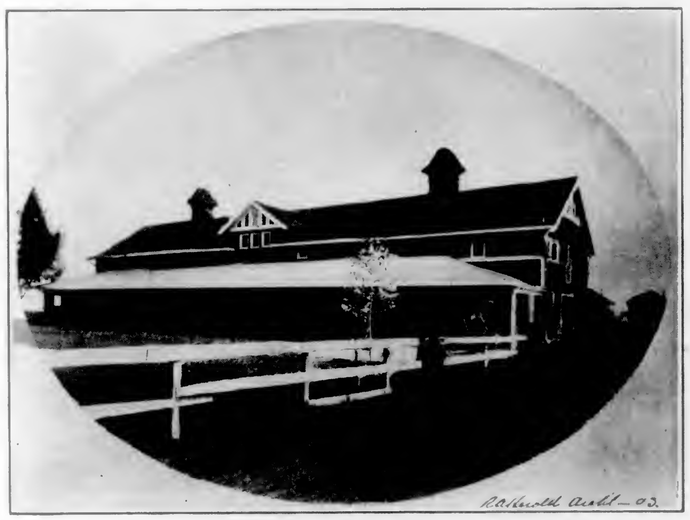
His talent has attracted to him the patronage of bankers and financiers, of the largest corporations in the city, and of the State and Municipal Governments. His manner of handling large subjects has furnished him a clientele from beyond the boundaries of the county, notably in the case of the High School at Auburn, Placer County.

Mr. Herold's plans for the Sacramento High School were most exactly fitted to the city's needs in this respect, and the completion of the building will assure him a lasting monument in the public opinion. His efforts to provide the business section with structures in keeping with the wealth and dignity of the State Capital have won for him a warm place in the estimation of the more progressive citizens, who still cherish hopes of a city beautiful on the broad river that marks its western limits.

The illustrations of buildings in Sacramento shown in this number are by Mr. Herold, and embrace practically every type of building from a church to a residence, and an office building to a livery stable.



Sacramento Odd Fellows' Temple *Siller Bros., Builders* C-403
Cornice Work by Sinclair & Bessey

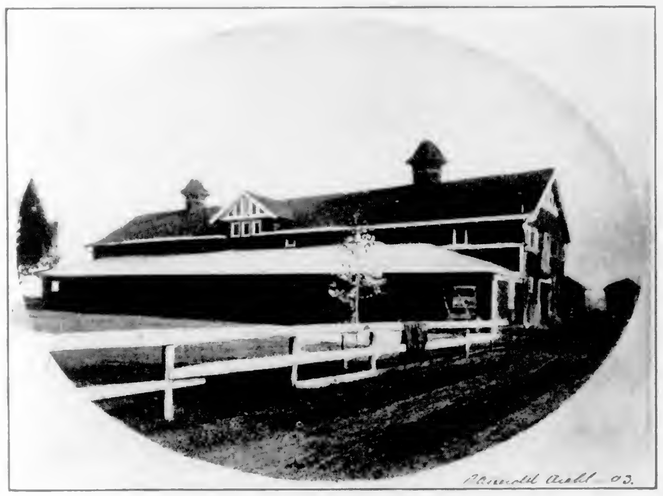


Stable for Buffalo Brewing Company, Sacramento C-404

Keyes Residence, Sacramento *Hook & Son, Builders* C-405
Electrical Work by Electrical Supply Co.

Corner in Living-Room of Keyes Residence, Sacramento C-406

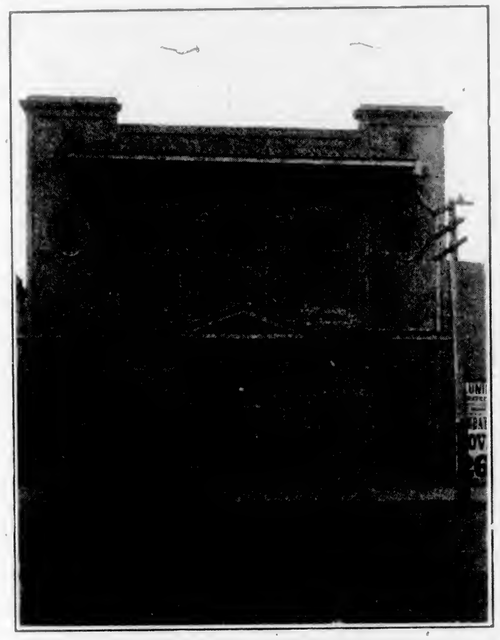
Sacramento Odd Fellows' Temple *Sillet Bros., Builders* C-403
Cornice Work by Sinclair & Bessey



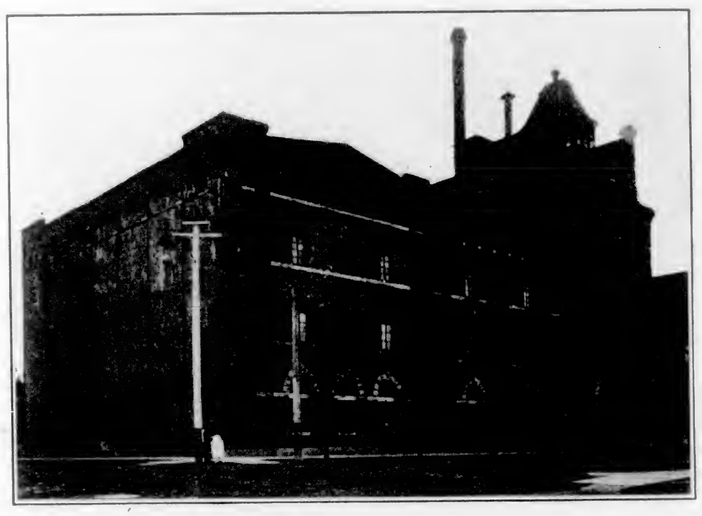
Stable for Buffalo Brewing Company, Sacramento C-404

Keyes Residence, Sacramento *Hook & Son, Builders* C-405
Electrical Work by Electrical Supply Co.

Corner in Living-Room of Keyes Residence, Sacramento C-406



Gormley Building, Sacramento — *C. J. Mathews, Builder* — C-407
J. W. Haley, Brickwork



Storage Building, Buffalo Brewing Company, Sacramento — C-408

Heating, Lighting and Electrical Work

System of Ventilation and Heating

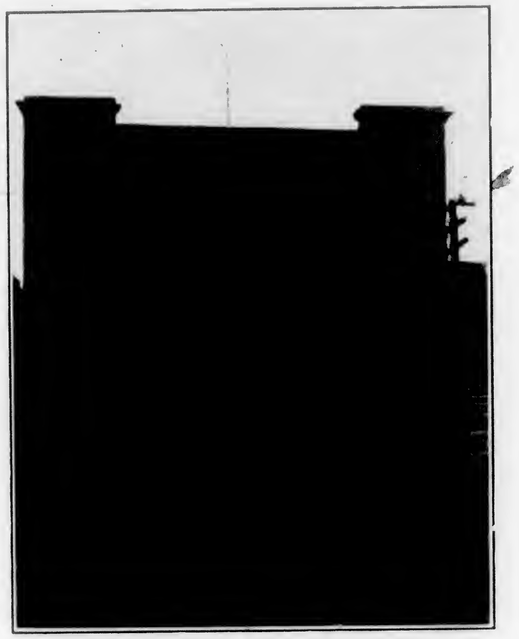
Edited by F. H. BRYANT

THE normal internal temperature of the human body is very near 100°, independent of the temperature of the surrounding air. By respiration the continuous process of slow combustion is kept up,—the oxygen of the air, uniting with the carbon of the blood passing through the lungs, to form carbonic acid. As in any case of combustion, overheating takes place unless provision is made for the distribution of the heat generated, so the body is kept at its normal temperature only by the abstraction of heat from it. The actual heating of the body is not the ultimate object of heating; but in reality, provision is made for the abstraction of heat generated by the vital functions without making too great a demand upon the physical endurance of the individual.

Means of Dispersion of Heat.—Three means are provided for the healthful dispersion of heat from the human body. First, by radiation to the air and surrounding objects. Second, by conducting, principally to the air immediately in contact with the body. Third, by evaporation of moisture from the lungs, throat and skin. Under the conditions of summer air, the last two are generally about equal, but the greater part of the heat is dissipated by the first means. Air is a nearly perfect non-conductor of heat, but radiation takes place through it readily. We may enter a room having a temperature of 75°, with walls at 50°, and feel chilled, simply because heat is rapidly radiated from the body through the air to the colder walls. In comparatively dry air equality of temperature is kept up by a steady but imperceptible evaporation from the skin. In moist air this rapid evaporation is prevented and the water is deposited as perspiration, the air being too heavily laden to take it up. On the other hand, when the air is in motion it increases both evaporation and conduction by the constant bringing of fresh air to take the place of that already moistened or heated. If, under any circumstances, one of these three means fails to abstract heat rapidly enough, the removal by the other means is increased, and equilibrium of temperature kept up.

High humidity has the effect of modifying very materially the temperature at which comfort may be secured. The excessive humidity of the atmosphere of the west and south of England has, owing to the reduced evaporation from the body, the effect of making a temperature of 56° in that country equally as comfortable as 80° in the dryer climate of Canada or Minnesota.

In this country, where some means of heating is usually required during about seven months of the year, the amount of heat necessary and the economy exercised in supplying it are vital questions. As will appear in what follows, convenience and economy can best be assured by an intelligent union of the heating and ventilating systems.



Gormley Building, Sacramento *C. J. Mathews, Builder* C-407
J. W. Haley, Brickwork

Storage Building, Buffalo Brewing Company, Sacramento C-408

Heating, Lighting and Electrical Work

System of Ventilation and Heating

Edited by F. H. BRYANT

THE normal internal temperature of the human body is very near 100°, independent of the temperature of the surrounding air. By respiration the continuous process of slow combustion is kept up,—the oxygen of the air, uniting with the carbon of the blood passing through the lungs, to form carbonic acid. As in any case of combustion, overheating takes place unless provision is made for the distribution of the heat generated, so the body is kept at its normal temperature only by the abstraction of heat from it. The actual heating of the body is not the ultimate object of heating; but in reality, provision is made for the abstraction of heat generated by the vital functions without making too great a demand upon the physical endurance of the individual.

Means of Dispersion of Heat.—Three means are provided for the healthful dispersion of heat from the human body. First, by radiation to the air and surrounding objects. Second, by conducting, principally to the air immediately in contact with the body. Third, by evaporation of moisture from the lungs, throat and skin. Under the conditions of summer air, the last two are generally about equal, but the greater part of the heat is dissipated by the first means. Air is a nearly perfect non-conductor of heat, but radiation takes place through it readily. We may enter a room having a temperature of 75°, with walls at 50°, and feel chilled, simply because heat is rapidly radiated from the body through the air to the colder walls. In comparatively dry air equality of temperature is kept up by a steady but imperceptible evaporation from the skin. In moist air this rapid evaporation is prevented and the water is deposited as perspiration, the air being too heavily laden to take it up. On the other hand, when the air is in motion it increases both evaporation and conduction by the constant bringing of fresh air to take the place of that already moistened or heated. If, under any circumstances, one of these three means fails to abstract heat rapidly enough, the removal by the other means is increased, and equilibrium of temperature kept up.

High humidity has the effect of modifying very materially the temperature at which comfort may be secured. The excessive humidity of the atmosphere of the west and south of England has, owing to the reduced evaporation from the body, the effect of making a temperature of 56° in that country equally as comfortable as 80° in the dryer climate of Canada or Minnesota.

In this country, where some means of heating is usually required during about seven months of the year, the amount of heat necessary and the economy exercised in supplying it are vital questions. As will appear in what follows, convenience and economy can best be assured by an intelligent union of the heating and ventilating systems.

A Chapel at Sacramento C-409

Natural Methods.—The requirements of good ventilation and heating being understood, the choice of the best methods for carrying out such requirements presents itself. While the principles have been generally understood, their application has proved to be the stumbling-block over which many an architect and engineer has tripped. Natural agencies, as apparently the least expensive, have usually been first called upon to produce such currents and move such volumes of air as might be required. But it will be universally admitted that all systems of so-called "natural ventilation" have proved themselves inadequate to fulfill all requirements. A dependence upon windows and doors for ventilation cannot with propriety be called a system of ventilation for the supply is ordinarily spasmodic, and without question, disagreeable, except in so far as a cold draught of fresh air from an open window may be preferable to the vitiated and odorous air of a confined apartment. Excellent results may continue for a number of days during the employment of a method of ventilation dependent upon natural agencies, but a change in the temperature or humidity, or in the direction and force of the wind, may exactly reverse the action of the system. Flues which were designed to furnish fresh air will be found to be actionless, while foul-air ducts may be bringing the foul air from other rooms. For a crowded or continuously occupied apartment, such arrangements are utterly inadequate and are certain to prove entirely unequal to the task of supplying air in such quantity as has been shown to be required,—above all, they are not positive.

Ventilation by Aspiration.—Somewhat more positive results may be obtained by warming the air within the vent flues. Gas jets, steam heated surfaces and the smoke flues from steam or hot air furnaces are employed for this purpose. But as the results attained are due to a lessened density of the

air within the flue, and as the heat applied for thus warming and rarifying this air serves no other useful purpose, but is dissipated in the atmosphere, the method proves to be excessively expensive when the power, as measured in heat units, required to develop this movement is taken into account.

Forced Circulation.—In the system of forced circulation by means of that universally adopted machine—a fan or blower—the action is **absolute** and **positive.** The whole matter cannot be better expressed than in words of the late Robert Briggs, a man of large experience in practical ventilation and heating: "It will not be attempted at this time to argue fully the advantages of the method of supplying air for ventilation by impulse through mechanical means,—the superiority of forced ventilation, as it is called. This mooted question will be found to have been discussed, argued and combatted on all sides, in numerous publications, but the conclusion of all is, that if air is wanted in any particular place, at any particular time, it must be put there, not allowed to go. Other methods will give results at certain times or seasons, or under certain conditions. One method will work perfectly with certain differences of internal and external temperatures, while another method succeeds only when other differences exist. One method reaches to relative success whenever a wind can render a cowl efficient. Another method remains perfect as a system if no malicious person opens a door or window. No other method than that of impelling air by direct means with a fan is equally independent of accidental natural conditions, equally efficient for a desired result, or equally controllable to suit the demands of those who are ventilated."

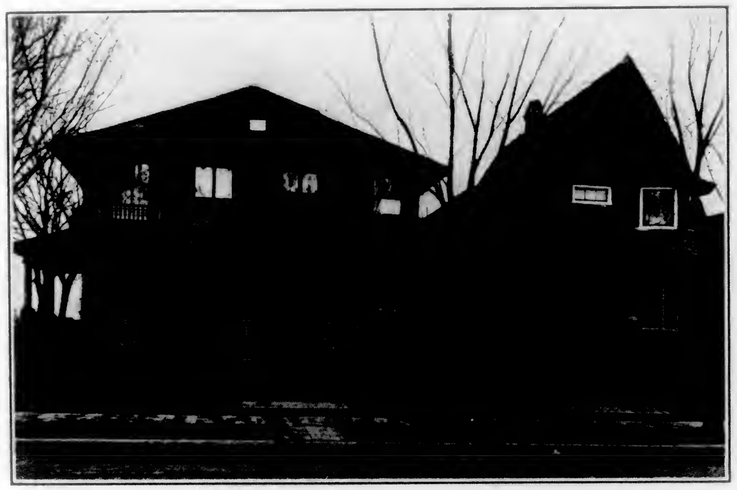
Efficiency of the Fan.—"In all mechanical appliances that is simplest which most positively and directly effects the purpose in view; and in this matter of supplying air, it may be claimed that the process of impelling it when and where wanted is at once the most certain and efficient, and that the fan (in its forms of a rotating wheel with vanes for large uses) is the simplest and readiest machine for impelling air. It will not be attempted at this time to discuss the theory of rotary fans. The fan itself will simply be accepted as one of the recognized appliances in the construction of ventilating apparatuses available with other mechanisms in established forms and defined types of American practice."

After showing the enormous expense of moving air by allowing it to pass over steam-heated surfaces (thus creating a difference in pressure due to a difference in temperature) compared with the expense of moving equal quantities of air by means of a fan, among the many mechanical devices for the movement of air through channels, none are so economical of power and convenient in use as the fan.

A practical illustration will best serve to prove the force of this statement. A vent flue, one square foot in cross sectional area and 40 feet high, is arranged to withdraw air from a room having a temperature of 70°, while the outdoor air is at 20°; the flue being provided with an accelerating coil, which heats the air within to 90°. By the ordinary methods of calculation it may be shown that the theoretical velocity of the air thus produced in the flue will be 1,149.4 feet per minute, and that there will be expended for its movement 394.6 heat units. A fan, on the other hand, would theoretically require, to produce the same air movement, only .703 units of heat. But these figures are purely theoretical, and the efficiency of the two methods must enter to give the true relation.

Assuming for the flue an average efficiency of 60 per cent, there will actually be required for this method 657.7 units of heat. On the other hand, making the fair assumptions that of the heat units in the fuel 70 per cent is

The Bryte Building, Sacramento C-410
Concrete Work by Adolph Teichert



Two Sacramento Cottages *A. W. Smith, Architect* C-411
Millwork by Sacramento Planing Mill

Fox Residence, Sacramento *John W. Haley, Brickwork* C-412

Corporation House, Sacramento *C. J. Mathews, Builder* C-413
Brickwork by Geo. L. Herndon

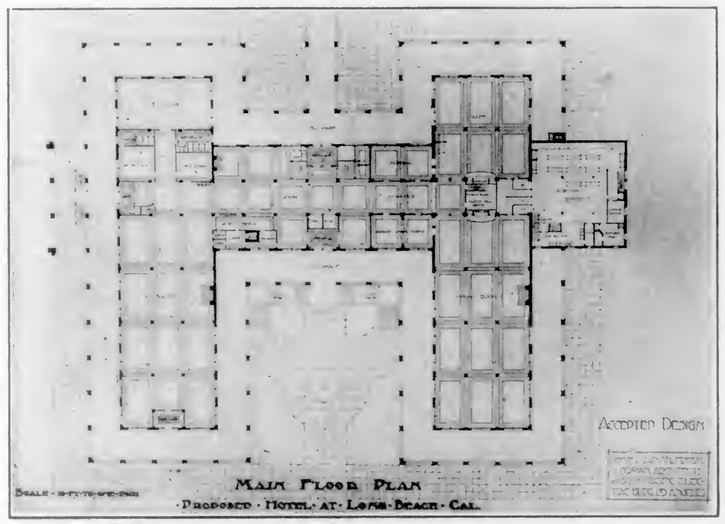
The Bixte Building, Sacramento C-410
Concrete Work by Adolph Teichert

Two Sacramento Cottages *A. W. Smith; Architect* C-411
Millwork by Sacramento Planing Mill

Fox Residence, Sacramento *John W. Haley, Brickwork* C-412

Corporation House, Sacramento *C. J. Matheves, Builder* C-413
Brickwork by Geo. L. Herndon

New Bixby Hotel, Long Beach *Austin & Brown, Architects* C-414



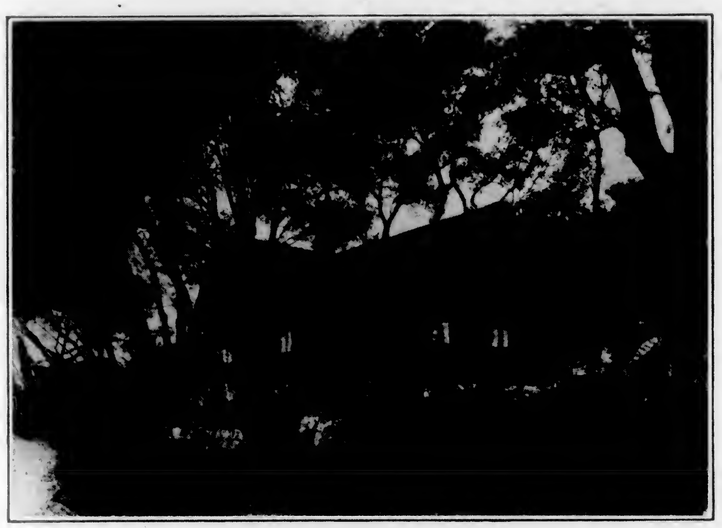
Austin & Brown, Architects C-415

delivered in the form of steam, that this steam is utilized in an engine having an efficiency of only 10 per cent, while the fan driven thereby turns into useful work only 25 per cent of the power delivered to it by the engine, the combined efficiency of the system will be reduced to 1.75 per cent, calling for a heat expenditure of 40.17 units. Even under this practical condition it appears that the movement of air by aspiration still requires 16.37 times as much heat (which is simply a measure of the coal bill), as a fan producing the same results. Of course a change in the conditions will affect this relation to a reasonable extent, but it is certainly evident that the thermal or aspiration system requires more fuel than the fan under all practical conditions as they exist in any system of heating and ventilation.

* * *

No Evidence of Insanity

IT IS to be regretted that the poor lady who bequeathed her property for the erection of a Gothic structure in a central part of London (which was to be a joy forever) was declared to be of unsound mind, memory and understanding. It is of such rare occurrence for any one to dream of creating a work of the kind, if the will had been carried out in a satisfactory manner other people might be disposed to imitate the testatrix. Miss Lina Beatrice Clayton-Browne, whose will came before the courts on Saturday last, died on March 24, 1904, in her thirty-second year. In August, 1900, she had a will drawn up while staying in Windsor. In it she directed that after the payment of an annuity "the whole of the trust fund and the accumulations of income thereof were to be applied in the erection, without buying land, of an ornamental structure of Gothic design, such as a market-cross or street-crossing refuge in the style of a market-cross, tall clock, street-lamp stand, or all combined, in a central part of London, the plan whereof shall be offered for open competition and ultimately decided upon by the Royal Institute of British Architects, and I especially desire that no inscription of my name shall be placed on such erection. In connection with the construction of the said Gothic erection I would wish that no large masses of dark metal, such as dark bronze or cast-iron, or of dead white marble or alabaster should be used, whether as statutes or otherwise, as I consider the effect of such large masses to be toneless and blurred, particularly in a moist climate. I should also like no pigment to be used upon any but an absolutely flat surface, and then but sparingly. In deciding upon the merits of the designs, I should like particular value to be laid upon the general outline as seen from a good distance. I should like to be inscribed upon the structure in letters of a different tincture to that of the ground, such as bronze letters in marble or stone, the following inscription: 'Many and munificent are the gifts ministering to the ills of the flesh, therefore is this structure dedicated merely to the more neglected gladdening of the eye.' 'A thing of beauty is a joy forever.' . . ." If the words were not those of the lady herself, there is no question that her intentions were expressed in it, for the solicitor stated she gave him instructions in an exceedingly sensible manner. The value of the estate was about £12,500. Various acts were proved which were sufficient to show that on other occasions the lady's mind was affected. The President of the Probate Court was satisfied, from the evidence, that he must pronounce against the will, and a central part of London has therefore lost an ornament.—The Architect.



Ross Valley Home of C. A. Meussdorffer, Architect C-416

Suburban Residence of Dr. F. J. Hund, Ross Valley C. A. Meussdorffer, Architect C-417

Damp Resisting Compounds

By HARRY LARKIN

THE tendency of brick, terra cotta and certain characters of stone to absorb water is the cause of considerable annoyance and has led to the introduction of a number of compounds claimed to prevent entrance of dampness through walls built of these materials. The question of dampness entering a wall is of vital importance now that steel is so largely used to carry the weights. The walls of all steel framed buildings are built light and unless some provision is made to keep the dampness away from the structural steel, there is sure to be trouble in time that will cause our sky-scrapers to wilt away. As an illustration, the Alto Building, at Bush and Kearny streets, was erected three years ago and the southerly wall was coated with three coats of a white paint on the outside in hopes of making the wall water-tight.

Last winter the writer was called in to pass judgment on the matter and found the painted walls of the halls along-side the southerly wall blistered from the dampness and the position of each steel column in the wall was indicated by rust marks from the ceilings to the floors. When the winter was over, the outside of this southerly wall was coated with "Pabco."

The building occupied by the Cordes Furniture Company on Geary street is solid brick walls, without structural steel, but dampness has entered at the various floors to such an extent that the tinting is ruined from the roof down.

All of these recently introduced damp proof compounds are claimed to leave a surface that will hold plaster. If such is the case, it will be a simple matter to coat exposed walls and plaster over the damp proof course in order to cover the objectionable color. Coating the back side of face brick would in a great measure keep water from entering the wall.

Asphaltum is the base of all effective damp proof compounds, so where there is important work in the water-proofing line to be done, it is best to rely upon the original material itself and not pay for some fancy name or take the chances of adulteration. Straight asphaltum can be adapted to any work a damp proof compound is claimed to do and accomplish the result without question of permanency. Nothing is saved in the cost by plastering directly on to brick walls coated with a damp proof compound in the interior of a building. To be sure the furring and lathing is done away with, but the carpenter is put to great additional expense in securing his casings, base and wainscot. Besides there is grave question as to whether the plaster will bond itself sufficiently to be permanent. It does not stand to reason that a compound will not absorb water and still make a bond with plaster. Even plastering onto rough brick surfaces is none too secure a job, with all the close adhesion of the two materials. However, if these compounds do make the bond they claim, they are invaluable in brick construction. But in my opinion it will take a few years' time, together with a few of our earthquakes, to fully demonstrate the question.

STREET PAVEMENTS.

No one disputes the fact of improvement made in changing the pavement of Third street to basalt blocks set on a concrete foundation and grouted with asphaltum and gravel. There is a question whether any other character of wearing surface would stand the heavy usage this street has, and the noise is noticeably less than on the old style basalt pavement. Improvements have

been made in each job of this character that have been laid and the wear the pavements on parts of Fourth street and the length of Third street have stood, demonstrates that a suitable pavement has been found to fit the conditions in the business section of the city.

Bituminous Rock pavements, laid with reasonable care, give good service in the residence districts where the grades are moderate. Laying the center of the street with basalt blocks and the edges with bitumen, provides a means of ascending a considerable grade that bitumen would not permit.

The asphalt mastic pavements, so common in other cities, will never come into general use in San Francisco, on account of there being no sufficient supply of sharp sand and gravel needed in laying them. Los Angeles and Portland are two cities on this Coast particularly blessed with an ample supply of sand, grit and gravel and as a consequence have pavements of asphalt mastic giving excellent service, as well as being clean and sanitary.

❖ ❖ ❖

Signing Architecture

WHATEVER may be the case in the old world, which gives a thought too much regard to graphic artists, in this country, in fact, on this continent, the architect is the leading figure. The names of prominent architects are well known, not in their own city only, but throughout their own country and beyond it. It is questionable whether any architect in the history of the world has ever been so widely known, in his own generation, to a general public, as is, at the present moment, Mr. Daniel H. Burnham. This is partly due to the widening of the architects' sphere, and in Mr. Burnham's case, to a celebrity gained by his successful conduct of the building operations of the Chicago Exhibition, continued by his connection with the Washington improvements project, and by the frequency with which he is applied to now for advice by cities that are devising improvements in their plan. But while these large dealings naturally attract attention, so that the newspapers mention Mr. Burnham's name with the same simplicity as they would a general's, in full confidence that every one will know who he is, there are architects who are not architects of cities but only of buildings, who are almost, if not quite, equally well known. Building is, in fact, going large nowadays; a single structure may be an important addition to any city, and this importance naturally gives the architect a new interest for the public. The interest spreads to the smaller designers, partly as members of the same profession but partly for another reason—the new importance that is attached by the mass of the people to their houses, since it has become as easy to own as to rent. Indeed, in some places in Canada it is more easy to own than to rent; for speculative builders build only to sell and will not rent. This state of affairs has brought about a widely spread domestic sentiment which is acting as a wholesome counteragent to the idea that life in a flat, without housekeeping or other responsibilities, is the American woman's due. The use in the United States of the pregnant word "home" instead of the simple word "house," irritating as it is when used on all occasions, marks how this sentiment has grown and how (which is our present object in noting it), the interest taken in small houses has become attached to their architects.

Even the press is not without signs of abandoning its tradition of ignoring the architect in its notice of buildings. The editors of the daily papers are still as sensitive to a "free ad." as they are to a typographical error, yet the names of the architects of projected buildings are always mentioned under the cuts of the buildings which are so frequently inserted now in the newspapers.

This growing interest in architects is a mark of awakening recognition that architecture is an art. This—it being the truth—is a good thing to have recognized. It is to the advantage of everybody that the recognition should be furthered in every possible way; and one way which has been frequently proposed is that architects should sign their buildings. In speaking of it recently, in a presidential address to the Architectural Association, Mr. Guy Dawber said that the signature of buildings is a custom on the continent. That it is not unknown in England may be seen on the terra-cotta face of a hotel building in Piccadilly, where the signature of Messrs. Ernest George and Peto, architects, appears as a conspicuous corner decoration. When one sees a signature, placed thus in a prominent position, one becomes seriously aware that it does not make for benefit to the architect unless he has done well. The proceeding clearly has a double side—both working for good; that the art of architecture should be exalted in the eyes of the public, and that the architect's sense of responsibility should be kept alert. When an architect did his work under a cloud of oblivion; paired off with the plumber in building operations, as equally undesirable and only not so necessary; it required stout and enduring character and conscience not sometimes to sink into a state of indifference and compromise. It is hard to uphold the fine thing against its neglect. It is hard to uphold an art alone. Indeed—as art that is alive always gets its living quality by expressing the life of its time, and only pedantry or eccentricity comes from the secluded artists—the more the architect is in touch with the world the better for his art.

The growing interest in architecture and architects is wholesome, and if it is assisted by a movement towards signing buildings it will be a good thing. It is quite likely that no formal assistance will be needed to such a movement, but that a custom so much in accordance with the general feeling of this time of Renaissance will arise, as customs do arise, all at once, everybody apparently following everybody else.—Canadian Architect and Builder.

❖ ❖ ❖

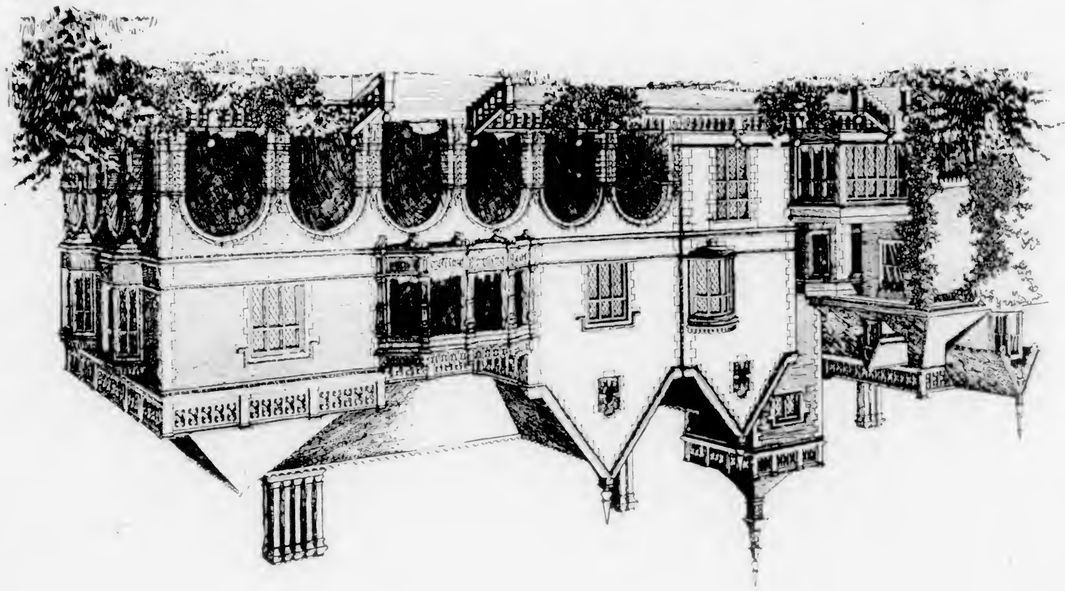
Apartment-House Construction

ONE of the most remarkable features of the building operations in Chicago for the past year is the amount of apartment-house or flat construction, which has been carried on on a scale of unprecedented magnitude.

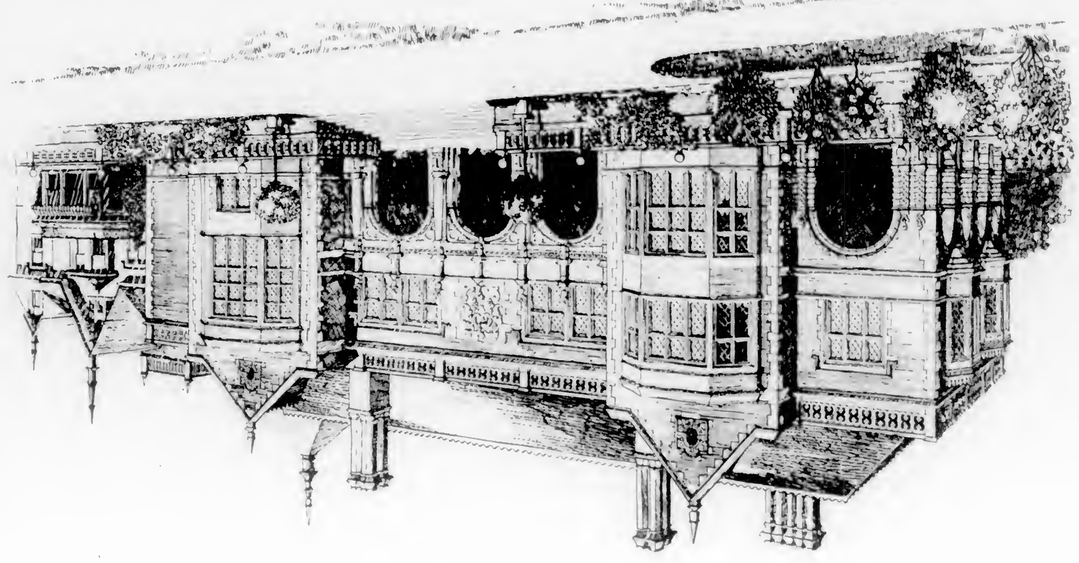
It had been thought that flat building in Chicago was overdone, and when in 1904 the total of the year's operations reached over $14,000,000 compared with $7,000,000 for 1903, it was expected by many that a slump would surely come and the figures for 1905 would show a considerable falling off. So far, however, from that being the case, the figures of the past year show the remarkable total of nearly $22,000,000, taking into account only building permits of $5,000 and upwards. It is true that these figures include buildings of the combination character, containing both flats and stores, but these form only a small proportion of the total.

It is evident from these figures that the people of Chicago are inclining more and more to residence in flats. The total of house construction, including only permits above $5,000, amounted for the year 1905 to less than $3,000,000, the greatest percentage of house building having been in the northwest section of the city.

It might be thought that, in view of the rapidity with which flat buildings have been constructed during the year, it would be difficult to fill them, but the contrary is the case, and all reports from owners, builders and agents agree that rents are well maintained, which is a sure evidence of the fact that the supply has by no means outstripped the demand.



Rear View of Country Residence of Mr. Eugene J. de Sabla — *Willis Polk, Architect* — C-419



Front View of Country Residence of Mr. Eugene J. de Sabla, San Mateo — *Willis Polk, Architect* — C-418

A Palatial Country Home

ARCHITECT WILLIS POLK has prepared plans for a palatial country residence for Mr. Eugene J. de Sabla, Jr., millionaire. The house will be unique in that it will be the first large country house on the Pacific Coast constructed entirely of brick and stone. It will be built at San Mateo.

The house will be the first example on this Coast of English renaissance of the Tudor period. Its mullion windows and Jacobean ornament and its arcaded loggia and vaulted vestibule will all be in harmony with the best examples to be found in any of the old English country places. The structure will be surrounded by a broad terrace, affording ample space for the much-sought-after outdoor country life of this section. The interior will contain a typical Old English hallway, with oak wainscoting and large chimney place. The main staircase will also be a feature of Elizabethian decoration.

The site of the mansion is that of the famous Howard homestead, El Cerrita. The latter was originally laid out by W. D. M. Howard and the first portion of it was brought around Cape Horn in the early '50's. Since that time it has been added to, and it is probably the most interesting of all California's country homes, many architects having been employed in its construction. After Mrs. Bowie's death, the house was occupied by some of the younger members of the Howard family, then by Charles A. Baldwin, the Tobins and others and finally passed into the possession of Walter S. Martin, who made extensive alterations and redecorated it throughout.

Mr. de Sabla recently bought the place, and will retain only the most modern part of the old buildings. The additions that he is now constructing are of the most permanent character.

❖ ❖ ❖

To Build Fine Art Gallery

THE Southern California Chapter of American Institute of Architects has purchased the lot fronting 50 feet on the east side of Alvarado, between Sixth and Orange streets, directly opposite Westlake Park, having a depth of 177 feet.

The purpose is to ultimately put up an art gallery, that will be more particularly devoted to architecture and permanent exhibits of casts, so that students may have the best examples before them, and to provide lecture halls and assembly rooms where all interested in architecture may have an opportunity to meet and study, and where architectural and drawing classes can meet. The building will also be made the headquarters for the architectural profession in Southern California where opportunities can be given for the development of all that is best in art and architecture.

At present a small building will be erected on the rear of the lot, that will be used as an assembly hall and sketch studio which will be the nucleus of the completed institution.

❖ ❖ ❖

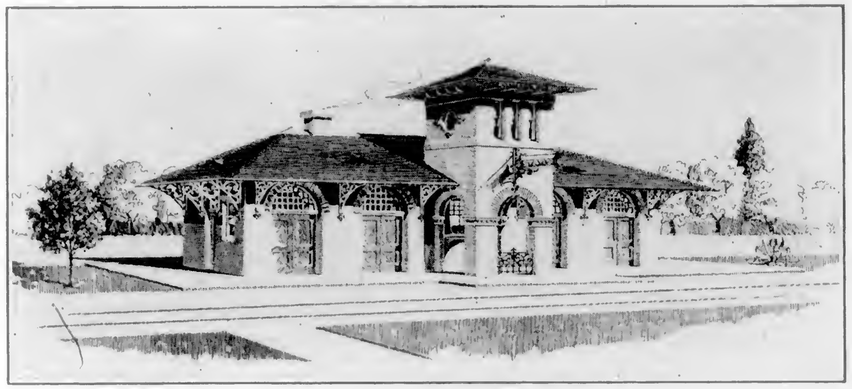
Auctioneer—"Going! Going! Gone! Here, sir, it's yours. Great bargain, sir. The frame alone is worth the price." Connoisseur (ripping out the picture)—"The frame was what I wanted."—New York Weekly.

❖ ❖ ❖

Customer (in restaurant)—"Waiter, I wish you would bring me a medium-done porterhouse steak smothered in mushrooms."

Waiter (to cook)—"Choke one with the toadstool!"—Milwaukee Sentinel.

First Church of Christ, Scientist *John Galen Howard, Architect* C-420



Design for Suburban Depot *R. A. Herold, Architect* C-421

Another Design for Suburban Depot *R. A. Herold, Architect* C-422

Cement and Concrete

Reinforced Concrete Construction in the Marysville Public Library

By M. C. COUCHOT, C. E.*

THE Marysville Public Library is the gift of C. Q. Packard, Esq., to the city of Marysville, and is a beautiful stone building, 75 x 75 in plan, set on a large lot on the corner of Fourth and D streets, where it will always be surrounded by a large lawn, which will always insure plenty of light and its prominent individuality. The plans are from William Curlett, architect. The exterior walls are of Colusa sandstone. The roof is of red tile. All the interior construction, including floors, beams, girders, lintel and parts of roof slabs are of reinforced concrete, built on the Kahn system of reinforcement.

The columns in the basement are 16 inches in diameter and 10 feet high and in the first floor, supporting the mezzanine and second floor, are 22 inches in diameter and 22 feet high and reinforced with eight ½-inch vertical rods and a continuous ¼-inch wire helix, 2½-inch pitch, according to the method of Mr. Considere.

The main girders over the main room are 18 x 32 inches, 32-foot span, and are reinforced with three 1¼-inch and two 1-inch Kahn bars.

All the main slabs in the building proper are of the hollow tile construction, 8, 10 and 12 inches in depth, set 16 inches on centers, giving a 4-inch space in which a ¾-inch Kahn bar is set and concrete poured in, making really a number of concrete joists 16 inches on centers. The spans are about 12 feet to 20 feet for this construction and are very rigid, sound-proof and fireproof.

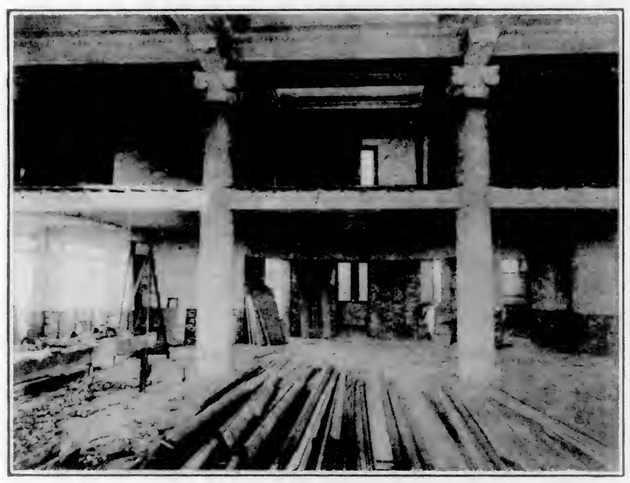
The work was erected during the hottest months of the year—July, August and September—and the greatest care had to be used in doing this concrete work, necessitating the material to be mixed dry below and taken up in the building to be wet right at the place where it was going to be put in, as it would not stand the transportation without taking initial set.

The results were very satisfactory. The hollow tile construction is particularly well adapted for this class of building, as well as for hospital, schools, theatres and office buildings, where large clear spans are desired, as spans as high as 30 feet can be had very easily.

The use of reinforced concrete is progressing rather slowly in California, where the climatic conditions are ideal for this form of construction and where all the materials are easily obtainable. But present indications show that the architects, owners and builders are taking cognition of the merits of this construction and that we may expect a decided increase in the number of buildings of this type, as in the Eastern States.

*Associate Member American Society of Civil Engineers, 604 Mission Street, San Francisco.

Marysville Public Library *William Curlett, Architect* C-423
Maurice C. Couchot, Engineer



View Showing Mezzanine Floor and 32-foot Span Girders, Marysville Public Library C-424

View Showing Tile Construction, Basement Marysville Public Library C-425

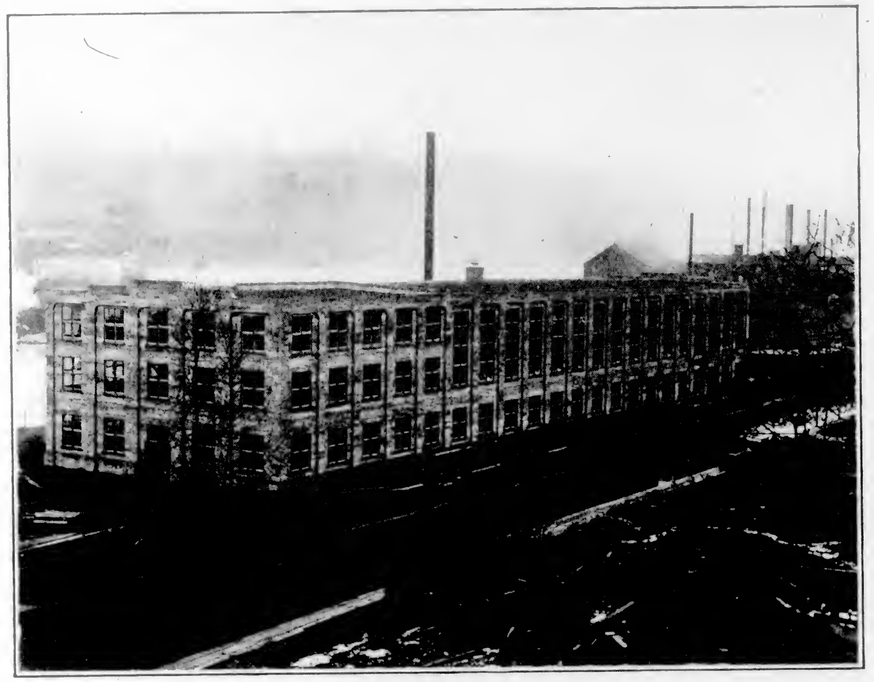
Curing Concrete Blocks

J. R. WHITE, of Elnloruk, Neb., writes in Municipal Engineering, about a method of curing cement blocks, which is a cheap and practical way for the operation of small works. He says: "We have made a practical use of it this summer and find it very satisfactory. We have racks built and covered with lumber four deep, two racks with a 4-foot alley between them with enough projections of roof to shade both sides. Each rack is wide enough for two tiers, so we use both sides. We set blocks out on these for twenty-four hours without any water (unless the heat or wind is rather severe, when we will sprinkle lightly a time or two as judgment dictates). Then we remove to the yards for further curing, where we can stack them three or four blocks high. When the day's work of yesterday is thus stacked, we give a thorough wetting, after which we cover them with some old hay, covering all ends and sides as thoroughly as possible. Then we keep the hay thoroughly wet from ten days to two weeks. The blocks cure nicely and practically evenly this way, and I believe that it will equal any system that is used to-day. I think that any manufacturer can use this method. If the old hay should be in the way, a good way would be to take burlap and make mattresses out of it. Excelsior is also good, the theory being to keep dampness on the outside of the block. We have cured something over 10,000 blocks this year in this way and are well pleased with the result."

❖ ❖ ❖

"I know, old chappie," said Dobbs, "she has her faults, and a temper, and all that; but I—I love her and can't live without her."

"Just so," calmly replied his friend; "but the question isn't that. Can you live with her?"



Exterior View of Willamette Pulp and Paper Mill at Oregon City, Built of Reinforced Concrete C-426

Another View of Willamette Pulp and Paper Company's Mill at Oregon City, Oregon. C-427

Paper Mill on the Pacific Coast of Reinforced Concrete

EARLY in 1905 the Willamette Pulp and Paper Company, of Oregon City, Oregon, presented plans to the Pacific Construction Company for a very large paper mill building to be erected in the city named.

The plans called for a brick and steel building, but by advice of F. A. Koetitz, chief engineer and vice-president, and F. M. Butler, secretary of the Pacific Construction Company, the plans were changed so as to call for reinforced concrete in place of brick.

The advice upon which this change was based was given for several reasons. In the first place, the Willamette Pulp and Paper Company were in haste to have their building built, and it was shown that much time could be saved by using reinforced concrete in place of brick.

Another principal reason was the conditions that would naturally surround a building erected in this special location, and devoted to the special purpose of pulp and paper manufacturing. The climate of Oregon City is a very rainy one, and the making of pulp and paper at the same time necessitates the use of a great deal of water; consequently, a building so located and so employed would be subjected to much moisture, both from without and within.

The paper mill building is at Oregon City, and is the largest of the kind on the Pacific slope. It is 339 feet long, 92 feet wide, and its walls are 56 feet high. It has a basement and two floors at the "beater" room end, and a basement and single floor in the machine-room end, with 20 feet between floors.

The foundation was laid upon a bed of heavy bowlders from the river. Trenches for the foundation walls were dug in the bowlders, and footings five feet wide put in.

On the top of these walls, and reaching up to the sills of the basement windows, the walls of the superstructure were made 28 inches thick; while the main walls of the building were made 12 inches thick, buttressed by 3-foot pilasters, 16 feet on centers, the pilasters being 20 inches thick. These pilasters are reinforced by corrugated steel bars, six bars being imbedded in each pilaster, and held in place by bands of 5/16 round iron, one foot apart. Through the main walls, both above and beneath the window openings, and extending the entire length of the walls, corrugated steel bars were also used.

Supporting the floors are concrete columns 20x24 inches in size and 16 feet apart lengthwise of the building, and at varying distances crosswise of the building, the distances being regulated to accommodate the machinery, and there being four lines of columns.

The main girders running lengthwise of the building are 20x30 inches, and the cross beams connecting thereto are 14x26 inches. The columns are reinforced by corrugated steel bars, four in each column, connected and held in place by 5/16 round iron. The beams are reinforced by both Kahn and corrugated bars. The floors comprise concrete slabs of an average thickness of six inches, which are reinforced by expanded metal. The top is finished with the usual sidewalk finish. In the basement story are also placed numerous piers for carrying the weight of the line shafts and paper mill machinery, all being reinforced by the same material as used in the beams.

For setting the heavy paper machinery and handling the product a traveling 90-ft. crane was furnished. This crane moves on a track of I-beams.

Exterior View of Willamette Pulp and Paper Mill at Oregon City, Built of Reinforced Concrete C-426

Another View of Willamette Pulp and Paper Company's Mill at Oregon City, Oregon. C-427

Paper Mill on the Pacific Coast of Reinforced Concrete

EARLY in 1905 the Willamette Pulp and Paper Company, of Oregon City, Oregon, presented plans to the Pacific Construction Company for a very large paper mill building to be erected in the city named.

The plans called for a brick and steel building, but by advice of F. A. Koetitz, chief engineer and vice-president, and F. M. Butler, secretary of the Pacific Construction Company, the plans were changed so as to call for reinforced concrete in place of brick.

The advice upon which this change was based was given for several reasons. In the first place, the Willamette Pulp and Paper Company were in haste to have their building built, and it was shown that much time could be saved by using reinforced concrete in place of brick.

Another principal reason was the conditions that would naturally surround a building erected in this special location, and devoted to the special purpose of pulp and paper manufacturing. The climate of Oregon City is a very rainy one, and the making of pulp and paper at the same time necessitates the use of a great deal of water; consequently, a building so located and so employed would be subjected to much moisture, both from without and within.

The paper mill building is at Oregon City, and is the largest of the kind on the Pacific slope. It is 339 feet long, 92 feet wide, and its walls are 56 feet high. It has a basement and two floors at the "beater" room end, and a basement and single floor in the machine-room end, with 20 feet between floors.

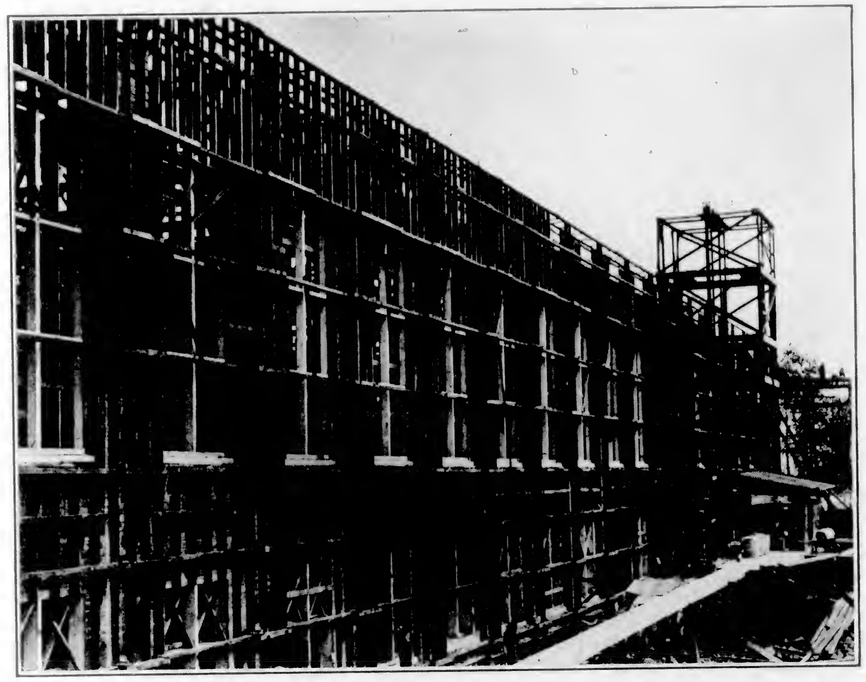
The foundation was laid upon a bed of heavy bowlders from the river. Trenches for the foundation walls were dug in the bowlders, and footings five feet wide put in.

On the top of these walls, and reaching up to the sills of the basement windows, the walls of the superstructure were made 28 inches thick; while the main walls of the building were made 12 inches thick, buttressed by 3-foot pilasters, 16 feet on centers, the pilasters being 20 inches thick. These pilasters are reinforced by corrugated steel bars, six bars being imbedded in each pilaster, and held in place by bands of 5/16 round iron. one foot apart. Through the main walls, both above and beneath the window openings, and extending the entire length of the walls, corrugated steel bars were also used.

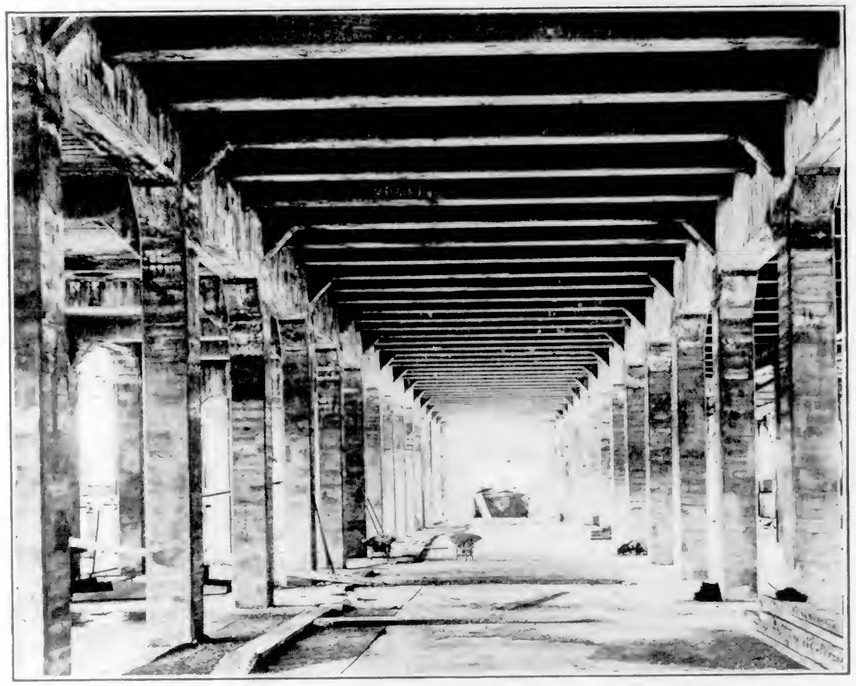
Supporting the floors are concrete columns 20x24 inches in size and 16 feet apart lengthwise of the building, and at varying distances crosswise of the building, the distances being regulated to accommodate the machinery, and there being four lines of columns.

The main girders running lengthwise of the building are 20x30 inches, and the cross beams connecting thereto are 14x26 inches. The columns are reinforced by corrugated steel bars, four in each column, connected and held in place by 5/16 round iron. The beams are reinforced by both Kahn and corrugated bars. The floors comprise concrete slabs of an average thickness of six inches, which are reinforced by expanded metal. The top is finished with the usual sidewalk finish. In the basement story are also placed numerous piers for carrying the weight of the line shafts and paper mill machinery, all being reinforced by the same material as used in the beams.

For setting the heavy paper machinery and handling the product a traveling 90-ft. crane was furnished. This crane moves on a track of I-beams,



Showing Concrete Forms, Willamette Paper Mill C-428



Showing Reinforced Concrete Columns and Beams, Willamette Paper Mill C-429

which are carried on concrete projections or brackets, which are a part of each pilaster. These brackets were reinforced with corrugated bars.

The materials used in the manufacture of the concrete consisted of local Willamette River gravel and Columbia River sand mixed with Teutonia cement. Mixture, 1-2 and 4.

The form sheathing was beveled 1x6 surfaced boards.

The roof trusses are steel girders spanning the whole 92 feet width of the building, and the roof covering is of wood felt with graveled top.

The materials entering into the manufacture of the concrete were landed upon the bank of the river near the site of the building, loaded into cars with an electric derrick, and the cars were then run to the mixer hopper.

After passing through the mixer the material was delivered into wheelbarrows, and the loaded wheelbarrows were raised to the required height by electric elevators.

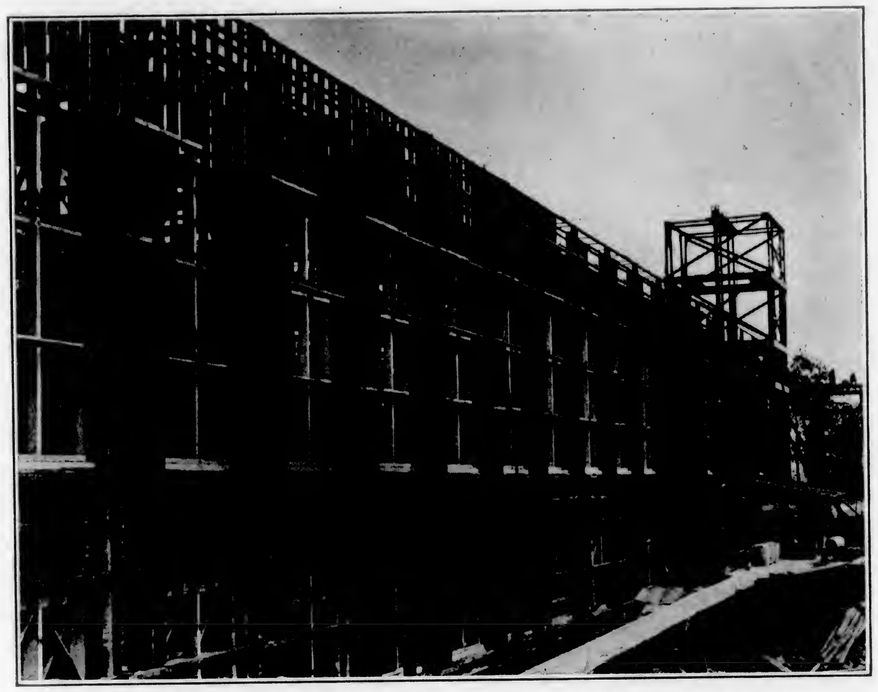
The floor system in this building was designed for a 400-lb. per foot load, and has been repeatedly tested during the placing of the machinery up to 800 lbs. without any possible sign of failure. It is a model in design for a mill building, and a credit to the owners and builders.

The same contractors are now erecting for the Bowers Rubber Works, near Black Diamond, California, a large mill building, which will be of nearly the same design as this Oregon building.

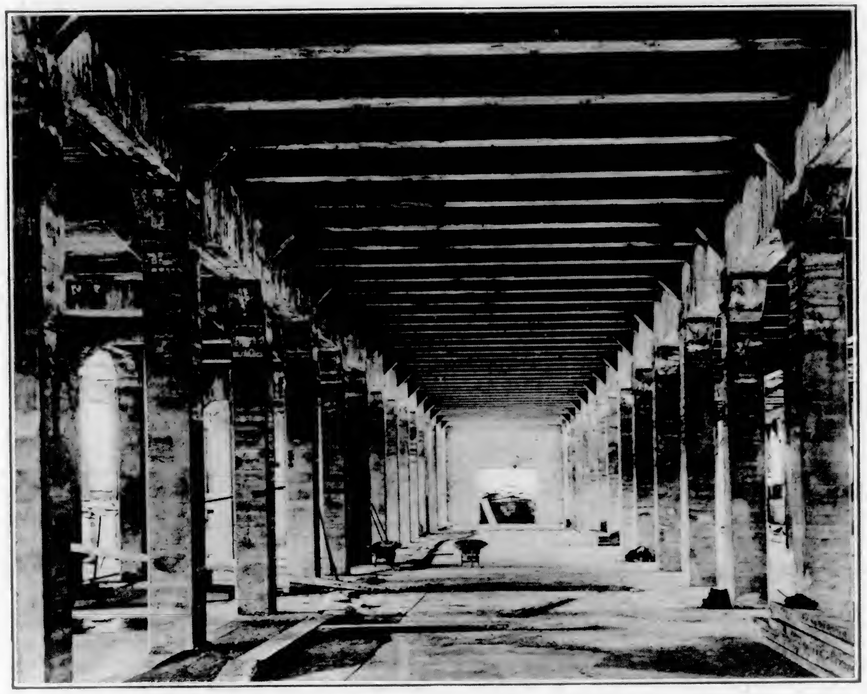
❖ ❖ ❖

Educating the Public

WHEN we talk about educating the public up to certain ideas of construction, the term "public" should be made to include the architects as well as the plain people. I mean no slight upon our brothers in the profession, but very many of them, and men of experience, too, don't seem to have the proper appreciation of the necessity of good construction. Then they blame people for insisting upon having an engineer look after the work. They think altogether too much ado is made over engineering, and often complain that people do not fully appreciate the architect's part of the work. It is clearly up to him, the architect, to pay more attention to construction if he does not want the engineer to carry off the best plums on the building tree. I have before me the specification of quite an important building and it, the specification, is a fair sample of what I have to revise day after day. This particular specification is for a hotel building involving an outlay of probably $350,000. The cutting of the stone, how it shall be dressed, just how the moldings shall be and all that sort of thing takes up 420 lines; the interior woodwork is covered by 286 lines; the painting and glazing 170; the decorative marble work 308; and the structure, the skeleton, its fireproofing, the very in'ards of the whole structure, is all described in just 16½ lines! Of course, there is a general clause that says all cements for concrete, steel work and so on, shall be subject to tests and inspection and the approval of the architect, but under this particular specification, if I were a contractor and inclined to be tricky, I know that I could figure on building that building, as far as the structure goes, just about as I pleased. The architects certainly have no one to blame but themselves if people feel that they have to call in engineers and experts to see that their buildings are properly designed as to their structure. Owners have gotten into the notion that they themselves can plan the essentials of a building, the little cupboards and things, that an engineer will fix them up a structure and that all the architect is good for is to put on a little prettiness outside and detail the beautiful hardwood, cabinet mantels, spindle stairways, etc., inside.—F. W. Fitzpatrick in Fireproof Magazine.



Showing Concrete Forms, Willamette Paper Mill C-428



Showing Reinforced Concrete Columns and Beams, Willamette Paper Mill C-429

which are carried on concrete projections or brackets, which are a part of each pilaster. These brackets were reinforced with corrugated bars.

The materials used in the manufacture of the concrete consisted of local Willamette River gravel and Columbia River sand mixed with Teutonia cement. Mixture, 1-2 and 4.

The form sheathing was beveled 1x6 surfaced boards.

The roof trusses are steel girders spanning the whole 92 feet width of the building, and the roof covering is of wood felt with graveled top.

The materials entering into the manufacture of the concrete were landed upon the bank of the river near the site of the building, loaded into cars with an electric derrick, and the cars were then run to the mixer hopper.

After passing through the mixer the material was delivered into wheelbarrows, and the loaded wheelbarrows were raised to the required height by electric elevators.

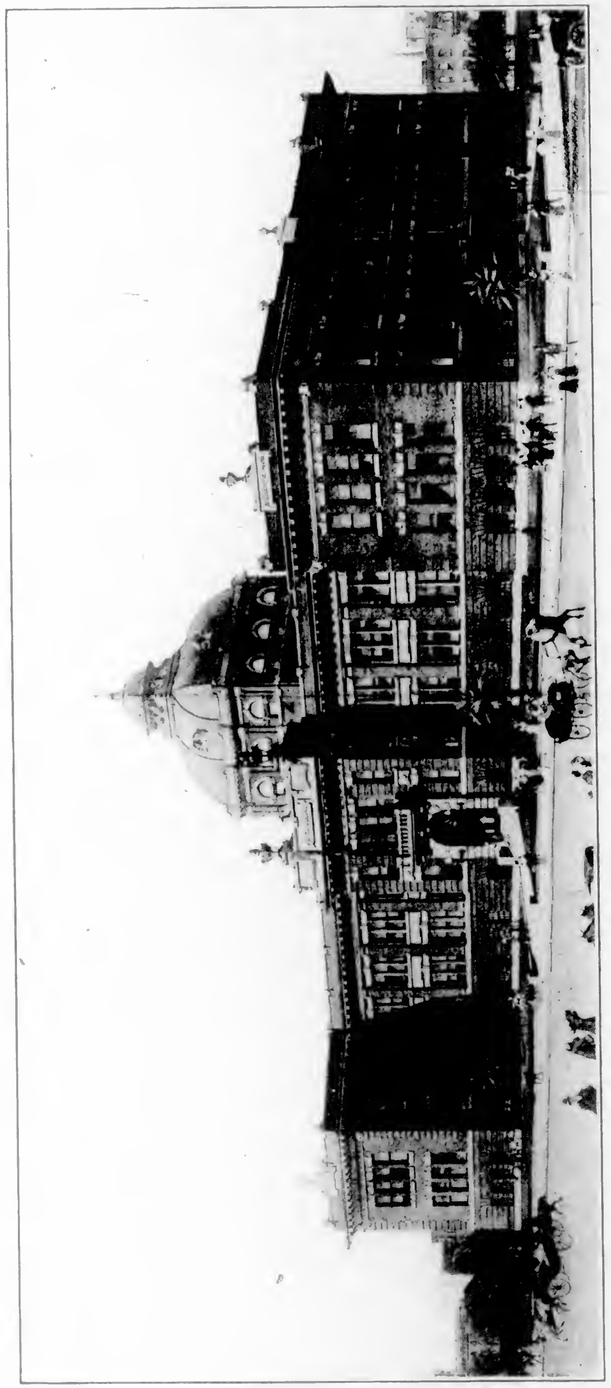
The floor system in this building was designed for a 400-lb. per foot load, and has been repeatedly tested during the placing of the machinery up to 800 lbs. without any possible sign of failure. It is a model in design for a mill building, and a credit to the owners and builders.

The same contractors are now erecting for the Bowers Rubber Works, near Black Diamond, California, a large mill building, which will be of nearly the same design as this Oregon building.

❖ ❖ ❖

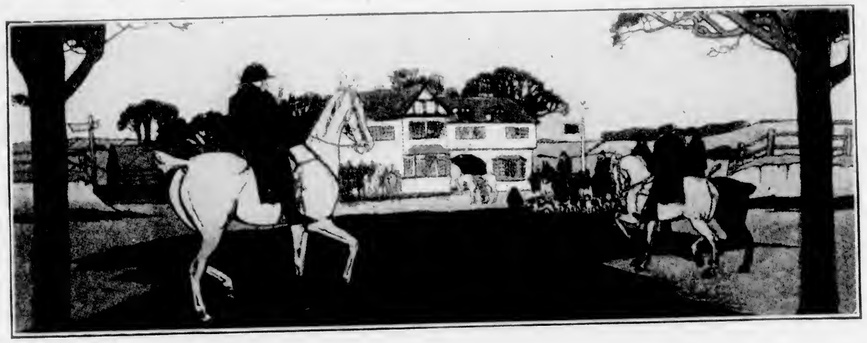
Educating the Public

WHEN we talk about educating the public up to certain ideas of construction, the term "public" should be made to include the architects as well as the plain people. I mean no slight upon our brothers in the profession, but very many of them, and men of experience, too, don't seem to have the proper appreciation of the necessity of good construction. Then they blame people for insisting upon having an engineer look after the work. They think altogether too much ado is made over engineering, and often complain that people do not fully appreciate the architect's part of the work. It is clearly up to him, the architect, to pay more attention to construction if he does not want the engineer to carry off the best plums on the building tree. I have before me the specification of quite an important building and it, the specification, is a fair sample of what I have to revise day after day. This particular specification is for a hotel building involving an outlay of probably $350,000. The cutting of the stone, how it shall be dressed, just how the moldings shall be and all that sort of thing takes up 420 lines; the interior woodwork is covered by 286 lines; the painting and glazing 170; the decorative marble work 308; and the structure, the skeleton, its fireproofing, the very in'ards of the whole structure, is all described in just 16½ lines! Of course, there is a general clause that says all cements for concrete, steel work and so on, shall be subject to tests and inspection and the approval of the architect, but under this particular specification, if I were a contractor and inclined to be tricky, I know that I could figure on building that building, as far as the structure goes, just about as I pleased. The architects certainly have no one to blame but themselves if people feel that they have to call in engineers and experts to see that their buildings are properly designed as to their structure. Owners have gotten into the notion that they themselves can plan the essentials of a building, the little cupboards and things, that an engineer will fix them up a structure and that all the architect is good for is to put on a little prettiness outside and detail the beautiful hardwood, cabinet mantels, spindle stairways, etc., inside.—F. W. Fitzpatrick in Fireproof Magazine.



R. A. Herold, Architect C.430

Accepted Design for High School at Sacramento



Interior Decoration
Up-to-Date Furnishing

The Living-Room

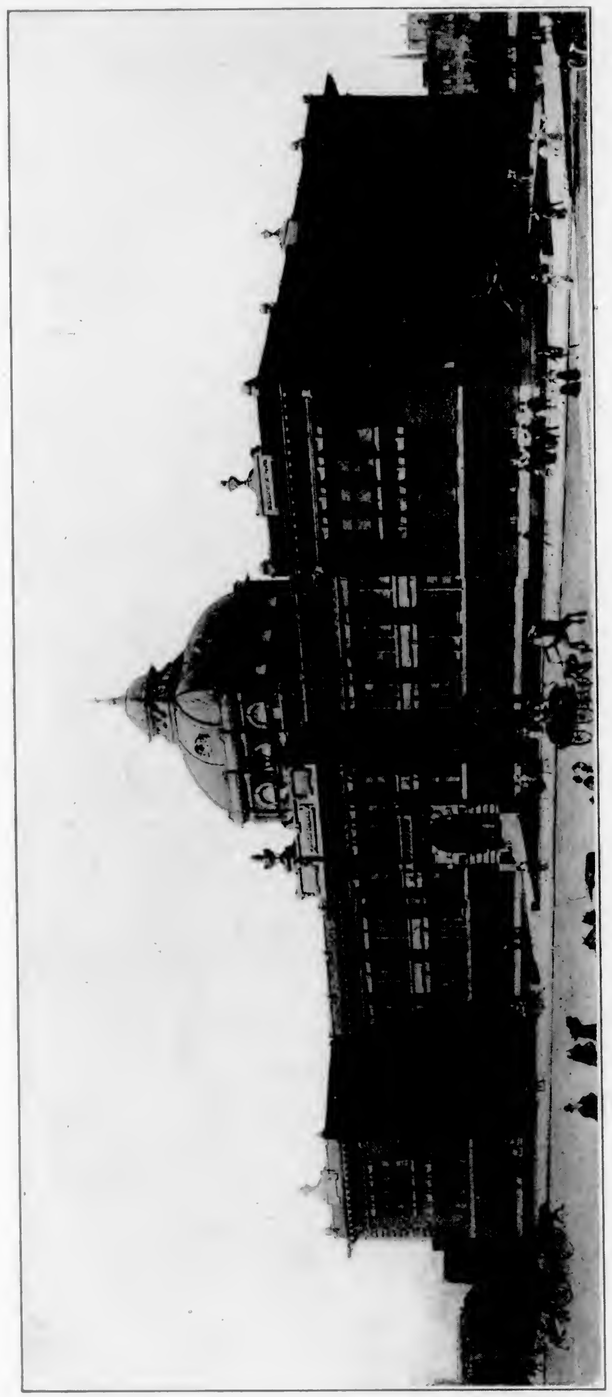
By C. WALTER TOZER

THE living-room has come to stay, and is now regarded as the most important room of the house. A large and simply furnished living-room, where the business of the home life may be carried on freely with pleasure, may well occupy all the space ordinarily divided off into small rooms, conventionally planned to meet supposed requirements.

The living-room is the executive chamber of the household where the family life centers and it is the place where work is to be done, and it is also the haven of rest for the workers. It is the place to which a man comes when his day's work is done, and where he wishes to find himself comfortable and at ease in surroundings that are in complete harmony with his daily life, thoughts and pursuits. The conventional parlor, which has been so common until recently, has been replaced by the living-room. Although we have gotten rid, to a great extent, of the odious word "parlor," and when it seems too pretentious to say "drawing-room" we say "living-room" instead, still the science of furnishing and decorating the apartment, so difficult to describe, appears to be even more difficult, judging from even our latest endeavor.

If an American be prosperous in money matters, he is so apt to furnish and decorate his living-room in very bad taste. His furniture will no doubt be of bad design while the decorations will neither be those for a living-room nor those for a reception-room, but just an incongruous mixture.

To decorate the living-room, which should always have some kind of doors to make it distinct and separate from the hall, avoid "piano-top" effects, except for the piano itself, for all highly varnished surfaces tend to defeat the purposes of every day usage; at least they make us feel uncomfortable, even if we have the means to revarnish again, for scratches are always unsightly and disorderly. Choose the dull waxed finishes for your living-room; as with the dining-room, do not effect a severely pronounced style. That is the underdone way of decorating.



R. A. Herold, Architect C.430

Accepted Design for High School at Sacramento

Interior Decoration
Up-to-Date Furnishing

The Living-Room

By C. WALTER TOZER

THE living-room has come to stay, and is now regarded as the most important room of the house. A large and simply furnished living-room, where the business of the home life may be carried on freely with pleasure, may well occupy all the space ordinarily divided off into small rooms, conventionally planned to meet supposed requirements.

The living-room is the executive chamber of the household where the family life centers and it is the place where work is to be done, and it is also the haven of rest for the workers. It is the place to which a man comes when his day's work is done, and where he wishes to find himself comfortable and at ease in surroundings that are in complete harmony with his daily life, thoughts and pursuits. The conventional parlor, which has been so common until recently, has been replaced by the living-room. Although we have gotten rid, to a great extent, of the odious word "parlor," and when it seems too pretentious to say "drawing-room" we say "living-room" instead, still the science of furnishing and decorating the apartment, so difficult to describe, appears to be even more difficult, judging from even our latest endeavor.

If an American be prosperous in money matters, he is so apt to furnish and decorate his living-room in very bad taste. His furniture will no doubt be of bad design while the decorations will neither be those for a living-room nor those for a reception-room, but just an incongruous mixture.

To decorate the living-room, which should always have some kind of doors to make it distinct and separate from the hall, avoid "piano-top" effects, except for the piano itself, for all highly varnished surfaces tend to defeat the purposes of every day usage; at least they make us feel uncomfortable, even if we have the means to revarnish again, for scratches are always unsightly and disorderly. Choose the dull waxed finishes for your living-room; as with the dining-room, do not effect a severely pronounced style. That is the underdone way of decorating.

And do not go in too much for the latest cult, such as we have in Mission furniture, so called. Mission furniture, while good in many respects, has been vulgarized by fashion. Do not try to have the furniture all match. Really good, historical pieces of furniture rarely clash with one another. On the other hand do not select a number of inharmonious things. Better err upon the other side, and have too few things, even to a sense of emptiness; for nothing is more fatal to a successful living-room than crowding and confusion.

The living-room must be, above all things, homelike. Reds and browns and soft tapestry greens appearing in the wall paper, the floor covering and the draperies will help toward this result, and the furniture should be of the comfortable, rather than the ornate variety. A fireplace, when possible, is a wonderful addition, and a reading lamp makes the room look far more inviting at night than gas or electric chandeliers. There are a great many styles of wall paper and wall hangings that can be used to very good advantage in the living-room. The soft fabric effects are excellent for the walls, with a preference for quiet patterns if there are many pictures. The landscape frieze, of which there are so many beautiful ones, is also very effective. Nothing too obtrusive in either pattern or coloring should be used in this room. The restful and homelike effect should prevail, and this cannot be obtained with highly colored and bold patterned wall hangings.

❖ ❖ ❖

Taste in Household Decoration

THE great requirement in household furnishings is taste. It is, of course, thoroughly delightful to have as much money to spend on a house as one wishes to, and to be indifferent, so far as the money goes, as to how much is spent; but it is much more important, as to results, to have only good things, disposed in a good way, charming wall papers, refined ornaments, exquisite combinations. These are the elements which go to make an artistic interior, not the mere amount of money paid for them.

The price of an article is no criterion of its merit, except that high priced articles should have greater art value than low priced goods. Art, real art, is costly, because much time and effort goes into its production. The genuine artist works slowly; if he belongs to the first rank he will produce but one or two masterpieces a year, perhaps not more than one in several years. He will use costly raw materials, because he knows his use of them will result in a fine production. He will apply to his task the knowledge and experience gained by many years of effort, possibly years of unremunerative effort. And in the meanwhile he has lived and must live, and he expects to be recouped for his expenses. All these things make his prices large, although his profits may be very small.

On general grounds, therefore, good art is expensive. So also is bad art. Very high prices are often charged for very bad objects, and, which is very much worse, obtained for them. The result is much more disastrous than being simply a bad purchase, for many people are fascinated by high prices, and will pay large sums for false works of art which not only have no right place in a house, but which destroy the effect of whatever symmetry and harmony and beauty may have been obtained by artistic effort.

Nothing so completely destroys the effect of any room so much as the introduction of a gaudy, conspicuous, unartistic object which has no right place in any well designed and artistically arranged home. It is bad enough when such things are given to one; it is scarcely short of a crime to deliberately purchase them under the singular notion that something of genuine art value is being obtained. It is bad in every sense. It shows that the possessor has no real taste herself, and it encourages the production of fake art objects, which would quickly disappear from the shops were there no market for them.

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession :: :: ::

Goes to Paris.

A. Dodge Coplin, in a letter to the Architect and Engineer of California, writes as follows:

Washington, D. C., March 19, 1906.—Now which one of you, in a late issue of your magazine, said that I had removed to New York permanently? To be sure, I did remove to New York, but likewise to Boston, Philadelphia, Baltimore and Washington, but only for a brief sojourn, brothers, therefore temper the statement in your columns and instead credit the writer with temporary absence while en route through the East and Europe. Am even now leaving for a brush with the March Atlantic storms, and hope in a few days to be in Paris.

A great deal of large and heavy work is progressing in all parts of our country, and here in Washington are a round dozen of undertakings quite collossal in size.

Senator Clark, who has recently spent large sums in a Fifth avenue, New York, residence, and which your journal recently illustrated, has invaded the Capital with the same desire, and is already having beautiful dwellings in a whole block razed to give way to another architectural dream for his Washington abode. (And we trust it will be more consistent than the Fifth avenue one.)

The classic beauty of several of the old government buildings, still chaste in line and proportions, is quite gratifying to look upon. The White House, also still retaining its colonial quiet splendor, remains planted on an undulating stretch of nature's common, reflecting the modesty of our form of government. Yet, on the other hand, a visit to the wings of the Capitol, and a bent ear to a few days' debate by the oratorical stars of our commonwealth, soon assures the visitor that things here are not quite as quiet as they seem. The roll and tumble of political strife and destiny surges by—but largely "underground," for things here flow deep and the game flies high.

Noting the rapid advance of steel in general construction reminds one of the close affinity the architect and engineer of the future must have for each other. In fact, I see some architects use both names to designate their professional card. So it seems that the name "Architect and Engineer" is above criticism as a title to an architectural publication. And may all continued success come to this publication and profession in general throughout the Pacific Coast.

A. DODGE COPLIN.

❖ ❖

Concrete Reservoir.

The Quartermaster's Dept., U. S. A., has accepted the plans and bids for a reinforced concrete reservoir for Fort Miley. The design, which was submitted by Cotton Bros. with their bid was made by Jno. B. Leonard, C. E. There were several bids for a less amount than the one accepted.

❖ ❖

The members of San Francisco Chapter, American Institute of Architects, enjoyed a banquet at the St. Francis Hotel the night of March 31st. Reinforced concrete was discussed informally, among those participating in the debate being William Curlitt, Clinton Day and President Henry A. Schulze.

❖ ❖

The firm of Wright & Polk, architects, at 124 Sansome street, San Francisco, has dissolved partnership, Mr Polk retaining the old offices while Mr. Wright has moved to 604 Montgomery street.

❖ ❖

Building Reports

Malt House, Sacramento. Architect, R. A. Herald, Sacramento. Cost, $175,000. Owner, Buffalo Brewing Company. The plans call for a four-story brick building, 105x80 feet, with iron and steel frame.

Elks' Building, San Diego. Owner, Elks' Building Association, San Diego. Cost, $50,000. Plans have been drawn for a brick and stone building, fire-proof, three stories and classic style. There will be stores on the ground floor, apartments on the second floor and lodge rooms on the top floor. The building will occupy the northwest corner of Second and D streets.

Residence, N street, between 17th and 18th, Sacramento. Architects, Seadler & Hoen, Sacramento. Cost, $8,000. Owner, James Elliott, Sacramento. Figures are now being taken for this house, which will be two stories, cement foundation and built of mahogany and oak.

Red Men's Hall, Sacramento. Owner, Sacramento Tribe of Red Men. Cost, $50,000. The plans have been finished by a San Francisco architect and may be seen at the Red Men's Wigwam, Sacramento. The plans call for a four-story brick building, with concrete block foundations, electric elevator, etc. Will be built on Tenth street, between I and J. Part of the contracts have already been let.

Fruit Cannery, Oakland, Cal. Land has been sold in Fruitvale on which it is stated there is to be erected a concrete and brick building for a fruit cannery.

Library, Gilroy, Cal. Andrew Carnegie has agreed to donate $10,000 for a public library building in Gilroy.

Bank Building, Sebastopol, Cal. The directors of the Bank of Sebastopol are considering plans for the erection of their new building, to be on the corner of Main street and Santa Rosa avenue.

Apartment House, Fillmore and Geary streets, San Francisco. Architects, Reid Bros., Claus Spreckels Building, San Francisco. Cost, $40,000. Owner, Mrs. Emma Butler. The plans, which are now being drawn, call for a unique colonial design, three stories, and stone foundation.

Three-story Building, Gough and Page streets, San Francisco. Architect, T. Patterson Ross. Cost, $35,000. Owner, S. F. Pumbers' Association. Building will be of brick and terra cotta.

High School, Sacramento. Architect, R. A. Herold. Cost, $150,000. The plans of Mr. Herold have been accepted. The building is to be of brick, three stories, with large dome; stone trimmings.

Flats, Van Ness avenue, San Francisco. Architects, Koenig & Pettigrew, Parrott Building, San Francisco. Cost, $45,000. Owner, Deaner & Stetson. The building will be four stories, with basement and frame construction.

Hotel, San Francisco. Architect, W. H. Armitage. Cost, $85,000. Mary Jane Daniell of London will erect a five-story building, to be built of iron, steel, brick and terra cotta, on pile foundations, at the junction of Clay, East and Merchant streets, opposite the Ferry Building.

Hotel, Seattle, Wash. President Moritz Thomsen of the Centennial Milling Company and A. M. Springer, a heavy Seattle property owner, are to erect a fourteen-story steel hotel building at the northeast corner of Sixth avenue south and Jackson street. The hotel will be 120x120 feet and will cost $500,000.

Residence, Santa Cruz. Architect, William Knowles, Post street, San Francisco. Owner, name withheld for present. Cost, $12,000. The house will overlook the ocean and will be one of the most picturesque residences in this famous watering place. The exterior will be of wood and plaster. The drawings are now being made.

Summer Residence, Menlo Park. Architect, William Knowles, Post street, San Francisco. Cost, $6,500. Owner, Dr. Carl Wilson, San Francisco. The house will be a shingled bungalow.

Masonic Temple, First street, San Jose. Architects, H. F. Starbuck, 206 Sansome street, San Francisco, and W. G. Page, San Jose. Cost, $50,000. Owners, Masonic Temple Building Association, San Jose. Plans by the two architects have been approved by the building committee and bids will be taken soon. Three stories; stone front; stores on ground floor; two halls; stained glass windows; elevators, etc.

The contract for building the new High School at Bakersfield, Stone & Smith, architects, has been let to the Lindgren-Hicks Co. for $50,000. The building is to be of brick.

City Hall, Reno, Nev. Plans have just been approved by the Reno, Nev., City Council for the erection of a new City Hall of brick and stone, to cost $75,000. The feature will be a 90-foot tower.

Alterations, Potomac Building, Los Angeles. Architects, Morgan & Walls, Los Angeles. Llewellyn Iron Works have taken the contract for removing the division wall between the Wetherby & North store, remove front walls and main entrance to building and put in new columns and girders and lintels, to carry front. Cost, $13,580. The wiring, plumbing, etc., for the building will be let later, under separate contracts.

Church, Fruitvale. The committee of the Episcopal Mission has selected a lot at the southeast corner of Nicol avenue and Capp street and work on the church edifice will soon begin.

Apartment Houses, Oakand. C. H. McGregor, contractor, is arranging to build two large apartment houses on northeast corner of Third avenue and East Sixteenth streets, one block from the car barns of the Oakland Traction Company. This will be for the convenience of the employes of the company.

Electric Lighting Station, Jessie street, San Francisco. Architect, Willis Polk, Sansome street, San Francisco. Cost $100,000. Owner, San Francisco Gas & Electric Light Company. The new building will replace the one recently destroyed by fire. It will be of brick outside, while the interior will be of glazed white terra cotta.

Hotel addition, Market street, San Francisco. Owner, Palace Hotel Company. Cost, $200,000. It has been decided to add two stories to the Palace Hotel and plans are now being prepared. For additional information see Colonel Kirkpatrick, manager of the hotel.

Hotel, Berkeley. Architect, C. M. Cook, Oakland. Owner, J. A. Marshall, Berkeley. Cost, $65,000. Plans are being prepared for a five-story hotel building to be of brick and terra cotta.

Apartment House, Ocean avenue and Elm street, Long Beach. Architects, Train & Williams, Long Beach. Cost, $25,000. Owners, J. H. Mulnholland & Son. Plans call for a three-story building, plastered frame. To be Mission style.

Board of Trade Building, Salinas, Cal. The Salinas Board of Trade has instructed its President to communicate with Architect Weeks of Watsonville, in regard to plans for their new building.

College Building, Spokane, Wash. Four new buildings, instead of one, are planned for the Spokane College, which is to be built in Manito Park by the Norwegian Lutherans of America, assisted by the citizens of the Inland Empire. It is expected that the main building will be completed this year and opened for students. It will cost in the neighborhood of $35,000.

Fire-proof building, Los Angeles, Cal. John C. Austin and Frederick C. Brown are preparing working drawings for the ten-story fire-proof building to be erected by Wright & Callender at Fourth and Hill streets. It will cost $200,000.

Fire-proof building, Los Angeles. Work will begin May 2d on the ten-story Central Block at Fifth and Springs streets. Carl Leonardt has the principal contract at $299,000. The building will cost $800,000. It will be occupied by the Security Savings Bank and offices.

Library, Monrovia, Cal. The Board has accepted plans and specifications for the new Carnegie Library, prepared by W. J. Bleisner.

Telephone Building, San Bernardino, Cal. The Sunset Telephone & Telegraph Company will at once build a modern exchange building of brick and stone, place wires underground and make other improvements in the service at a cost of more than $30,000.

Stores and flats, Fifty-third and Market streets, Oakland. Architect, C. M. Cook. Owner, E. L. Coryell. Cost, $7,500. The building will be two stories having two tile roof towers. Wood and plaster exterior, Mission style. There will be two stores and the same number of flats.

Telephone Building, Franklin street, Oakland. Architect, Walter Mathews, Oakland. Owner, Home Telephone Company. Cost, $25,000. The plans for this building are now being completed. Basement and part of first floor will be of sandstone, the remainder of the building, which is to be three stories high, will be of brick and terra cotta.

Club House, Cedar street, Berkeley. Architects, Maybeck & White, San Francisco. Owner, Hillside Club Association. Cost, $5,700. Nelson & Boldt have just been awarded the general contract for the erection of this building.

Club House, Harrison near Fourteenth street, Oakland. Architect, A. W. Smith, Oakland. Owner, Ebell Club. Cost $25,000. The preliminary plans have just been approved and the architect has been instructed to proceed with the detail drawings. The building will be Old English in style. Three stories; frame construction and besides the various club rooms will contain a hall and theatre.

Office Building, Union Square avenue and Stockton streets, San Francisco. Architects, Cunningham & Politeo, San Francisco. Owner, Schroth Company. Cost, $300,000. This building which has been previously reported in these notices will be eighteen stories high. The exterior is to be of stone, frame of steel and all partitions and floors will be of fire-proof material. The building will have two basements and will contain 255 offices. There will be three rapid running elevators.

Residence Ross Valley. Architect, C. A. Meussdorffer, Parrott Building, San Francisco. Owner, Willard O. Waymaire, Ross Valley. Cost, $8,000. House will be two stories and basement.

City Hall, Fresno. C. J. Lindgren has been given the contract for building the new City Hall at Fresno. His bid was $60,436.

Residence, Vallejo, near Devisadero street, San Francisco. Architect, C. A. Meussdorffer, San Francisco. Owner, C. L. Clark. Cost, $10,000. House will be two stories with basement and attic and slate roof.

The same architect has plans for six flats for S. Savannah on Hayes street, near Baker, San Francisco, and a residence for Dr. Perry to be built in Ross Valley.

M. E. Church, corner Fifth and Pacific, Long Beach, California. Architects, Marsh & Russell, Los Angeles. Cost, $100,000. Building will be built of artificial stone.

Theatre, Portland, Oregon. State Senator C. F. Clay has sold a corner of Third and Madison streets to the Considine-Sullivan Vaudeville syndicate for $235,000. The theatrical men intend to build as soon as the street is regraded and widened. Plans for the theatre show a seating capacity of 1600 with 12 boxes and two balconies.

THE
Architect and Engineer
OF CALIFORNIA

Published Monthly in the interests of the Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast by the Architect and Engineer Company.

SAN FRANCISCO AND LOS ANGELES

TERMS OF SUBSCRIPTION $1.00 PER YEAR

OFFICES

215 Sansome St., San Francisco Telephone Davis 945
142 Broadway, Los Angeles Telephone Home 5747

Entered as second-class matter November 2, 1905, at the Post office at San Francisco, California, under the Act of Congress of March 3, 1879.

Press of THE HICKS-JUDD COMPANY, 21-23 First Street. *Halftones and Etchings by* CALIFORNIA PHOTO ENGRAVING COMPANY, First and Mission Streets, S. F.

Vol. IV. APRIL, 1906 No. 3

The advent of concrete in house-building is a matter of concern to all classes. There has not been much of it in California, or on the Pacific Coast for that matter, up to the present time but there is every reason to believe that this particular mode of construction will become quite general in this section before long.

HOUSES OF CONCRETE

Reinforced concrete for large fire-proof buildings and bridges is bound to be accompanied by concrete house building. The doubt and prejudice that once existed with regard to concrete construction has almost entirely subsided and competent engineers and architects have demonstrated that it is no longer a problem to build a concrete house. Up to the present time there have been so few strictly concrete houses built on the coast that it would be difficult to make a comparison, from the standpoint of cost, with wood, brick and stone.

The fact that the prices of concrete construction work are decreasing with its more extended use in the building of homes is likely to impress the prospective builder who is looking for the newest, the best, and the cheapest with which to accomplish the desired result. In the East a large number of concrete houses have been erected at a cost actually less than that of frame buildings. As a result concrete is rapidly coming into favor as material for residence contracts.

Among the advantages claimed by advocates of the concrete houses are that being fire-proof, the insurance rates are necessarily much less; the house retains warmth, rejects heat, reducing the expense for fuel while the cost of repairs is little or nothing since concrete is practically indestructible.

The objection to building a home of concrete most commonly offered by architects is that it does not permit of artistic effort. A concrete home, they say, looks too cold and bare. It is believed, however, that in time it will be possible to make the concrete house quite as picturesque and artistic as the mansion of brick, stone or wood.

There are women, no doubt, who would be guilty of sending their daughters to a public gathering, dressed respectively in green, yellow and red. Of the same ilk, says "Good Housekeeping," is the person, man or woman, who will paint his house yellow next door to a green one, or build a seashore cottage of native stone and shingles on a narrow city lot between Queen Anne and mission houses, or crowd an architectural monstrosity, bristling with angles and pinnacles and jig-saw ornamentation, between two dignified mansions of a simple and severe type.

A WORD TO HOME-BUILDERS

Architects have hinted and urged and exhorted, and still home-builders in many instances—we might say, a majority—ignore the manifest requirements of space and surrounding architecture, to the detriment of their own homes. If we have not attained unto simplicity and grace in domestic architecture, we may yet take thought to the extent of recognizing our surroundings.

❖ ❖

When, a few years ago, Architect John C. Pelton sketched a birdseye view of San Francisco, showing numerous stately buildings rising well toward the clouds, the conservative San Francisco resident was wont to belittle Mr. Pelton's fanciful dream of the near future. It will be a great many years before the metropolis of the West will have the number of high buildings pictured by that architect, the more skeptical ones argued. But it is less than five years since Mr. Pelton made this picture and there are in reality more towering buildings in San Francisco to-day than the number shown in the sketch.

THE SKYSCRAPER IN CALIFORNIA

New York and Chicago can no longer boast of being without a rival in fireproof construction. Population considered, San Francisco can make quite as creditable a showing in high buildings as the two Eastern cities. The showing made by the California city is all the more remarkable in that nearly two-thirds of this class of construction has been carried on in the last four or five years. The year 1906 will probably see the commencement or completion of no less than a dozen great structures, among which we might mention the Humbolt Savings Bank building, sixteen stories; the Schroth building, eighteen stories and shown on the cover of this magazine; the Head building, fourteen stories; the Chronicle building, sixteen stories and others, not quite so high, like the Butler building, the Monadnock building and the St. Francis Hotel. The question has been asked us if the "high building craze is not being overdone." We answer, No. San Francisco is growing. Her future prosperity cannot be overestimated. There will be no trouble filling all the big buildings now under construction or that are being planned and as many more besides.

❖ ❖

Out of a very large number of patented and unpatented devices for making hollow concrete building blocks, and there are a couple of hundred of varied designs now being advertised and sold, there are a few planned and constructed on sound mechanical principles, which, properly handled, will turn out most excellent concrete building material.

HOLLOW BLOCKS, GOOD AND BAD

During the past year a number of these have been set up in California, and some very good, a much larger quantity of indifferent, and much too large a proportion of miserably poor blocks have been manufactured.

The object of this short article is to state and emphasize the fact that in almost no instance can the failure of the blocks be laid to the machine in which they were made.

The failures can be ascribed in a very few instances to the use of unsound cementing material, but in the

majority of cases must be ascribed to the very evident lack of knowledge or of carelessness of the makers of the blocks.

To successfully appeal to those whose favor must be secured in order to assure business success, the blocks must be sound and capable of carrying wall pressures with the usual margins of safety required; they must be reasonably impervious to water, and the finish must be good. The appearance must be pleasing to the eye, and the arras lines must be true, and sharp, and hard.

These points are absolutely essential, but the ability to secure them appears not to be possessed as yet by all who have gone into the "hollow block" business in California. The result is too large an output of blocks which must bring harm rather than benefit to the new industry, and there is no reason for this unfortunate condition.

If the Portland cement used were properly tested before use, as it should be by every block manufacturer, the few cases of failure resulting from unsound cement would be eliminated.

A cursory investigation which we have recently made, however, shows that in less than one case in ten are the simplest tests resorted to. That there is not more failure from this cause is only evidence of the honesty of the cement manufacturers.

The maker of a fine quality of concrete, such as should invariably go into the making of a building block, who does not know enough of the fundamental principles of concrete manufacture as to so proportion the inert aggregates used as to minimize air spaces or voids, should not, and indeed he can not long remain in the business. This improper selection of the various particles of sand, gravel or stone, is responsible for much of the porosity for which too many of the building blocks are rightfully condemned. The other reason is, of course, the unadulterated, downright stinginess in the matter of incorporating the Portland cement.

Where large sized stone aggregates may be used, as in massive abutments and foundations, and indeed in most other work, it is possible beyond question to manufacture a sufficiently strong concrete containing but one part in eight or ten of Portland cement. But in the manufacture of hollow building blocks, whose walls and webs are but three inches in thickness, more or less, much finer stone must be used, and a much larger surface of inert material must be coated with the cementing material. Concrete for hollow building block work should consist of at least 20% of good, sound, finely ground Portland cement.

Then as to the mechanical part of the work. Mechanical mixers do infinitely better work than can be done by shovel and hoe, but sufficiently good work can be done by the shovel and hoe method, and in many, very many cases, it is not done, and the carelessness is inexcusable. The result is a block spotty in strength, texture and appearance, a block that will help to hinder the inevitable growth of the industry.

Finally, in our opinion, it will be found advisable to turn out with a machine and a gang of men 150 well-tamped, carefully handled, approximately perfect blocks per day; good honest blocks that will almost sell themselves, than to feverishly rush out 200 blocks that are not homogeneous in texture, because of poor tamping, and with broken or patched corners that come from injudicious hurry in the handling.

Make a good block and it will bring what it is worth. Its inherent qualities, which are really marvelous, will bring this to pass, and it will help make a market for others of its kind.

A poor block had better be destroyed, for the enemies of the hollow block, and it has them, will hold it up as an example of all blocks. This is unfair, perhaps, but in this strenuous age many consider trade but a species of war, where everything is fair.

WILLIAM B. GESTER, C. E.

The Publisher's Corner

BOTH ARE HUSTLERS.

C. I. Chubbuck and R. E. Harris have formed a partnership under the firm name of Chubbuck & Harris, for the purpose of handling building materials, and have opened offices in the Atlas Building, 604 Mission street. They are selling agents for the following firms: Winsor's California Pottery and Terra Cotta Works, the California Brick and Pottery Company, Lamm Bros., Antwerp, Belgium (imported cements), the Baden Brick Company, and the Bostwick Expanded Metal Company of St. Louis.

Mr. Chubbuck has for the last five years been connected with the Steiger Terra Cotta and Pottery Works, and for two years as assistant manager and outside salesman.

Mr. Harris was salesman for the Western Fuel Company until he accepted the selling agency for the California Brick and Pottery Company, which he has held up to the present time. Both these young men are well and favorably known among the architects and contractors of San Francisco, and with their individual energy, backed up by the excellent lines they represent, they should undoubtedly do a very large business.

✣ ✣

WHAT X-OLITH IS

To the reader of the Architect and Engineer: "Let us tell you in a series of letters about X-Olith, what it is, how it is made, of what it is made, and its uses.

"X-Olith is a scientific combination of ground wood and stone—a cement wood-fiber; made into a plastic cement, laid for a floor, or wall, for wainscot, or base, and is particularly valuable where sanitary precautions are necessary, as in hospitals.

"As X-Olith became better known its uses expanded until now it is found in: Offices, schools, dairies, stores, lavatories, billiard-rooms, kitchens, breweries, natatoriums, laboratories, refrigerators, pantries, etc.

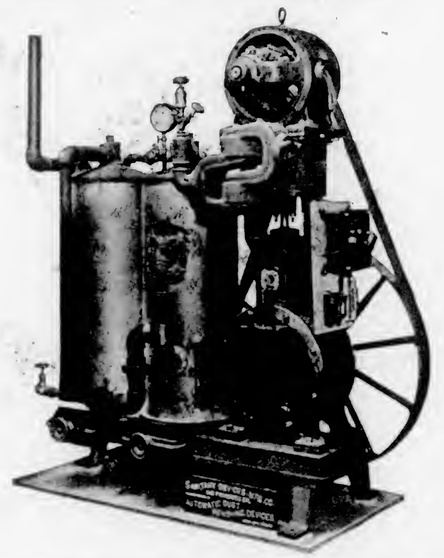
"The stone makes it outlast any other material used for like purposes and the wood-fiber makes it elastic, footwarm and tenacious, noiseless and cleanly.

"X-Olith is fireproof, damp-proof and sanitary. It is laid solid, there are no cracks or crevices for germs. There is a variety of colors and the center may be of one color and the border of another.

"Architects and builders are including X-Olith in specifications in new buildings and using it in old ones to make them as good as new. Samples will be cheerfully sent you upon request." The San Francisco office is at 153 New Montgomery street.

VACUUM SWEEPING PLANTS.

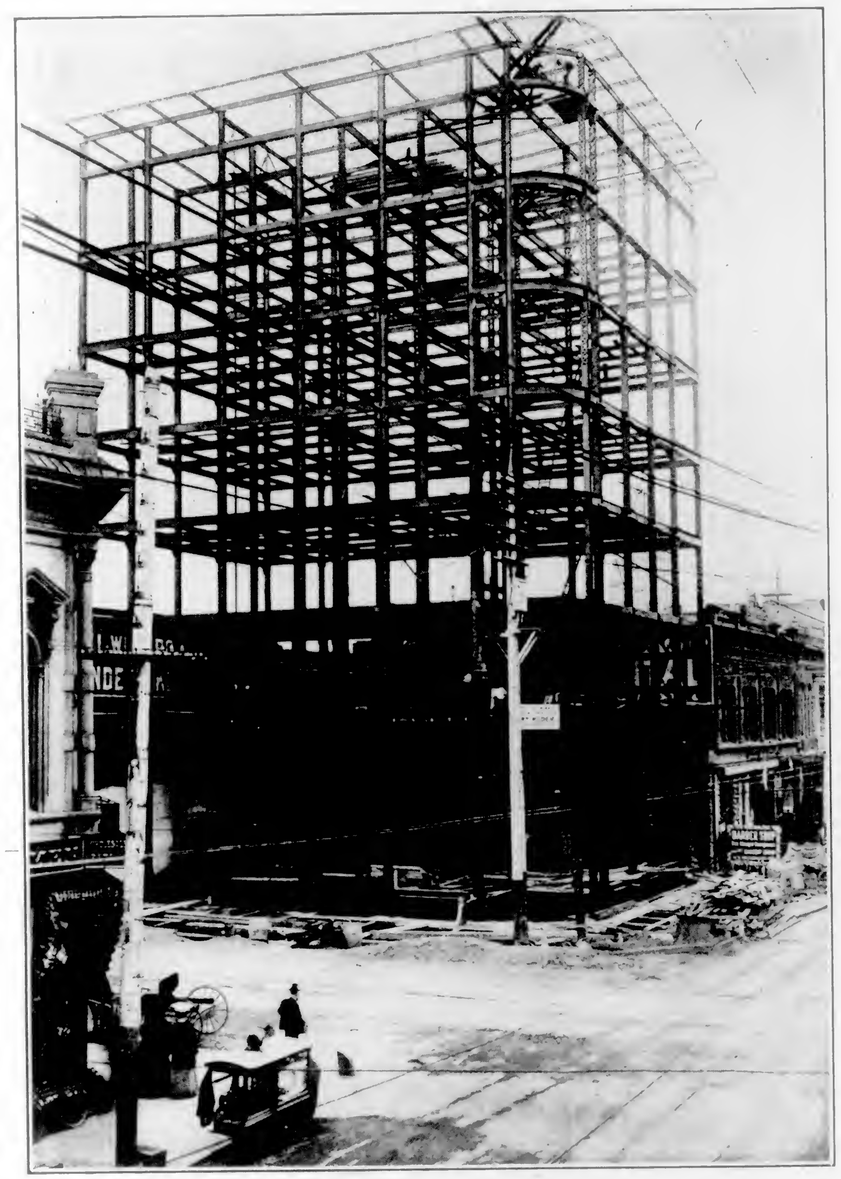
As time goes by the wants and needs of civilization are continually being fed by the inventive genius, and in this century no invention has been brought before the public that is daily becoming more and more in demand than vacuum sweeping plants.



While these plants were at first designed for hotels, theatres and public buildings, the manufacturers soon realized that private residences had as much need for them as the larger buildings.

The Sanitary Devices Manufacturing Company of San Francisco, the manufacturers of these plants, after careful experimenting, have now put on the market an especially designed plant for residences, perfect in every detail.

By referring to the cut, one can get an idea as to its appearance and size. The dimensions are: Length 5 feet, 2 inches; width, 3 feet, 4 inches; and height, 6 feet, 2 inches, so that there are but few basements that have not space enough for this machine.



Garden City Bank Building, San Jose. *Steel Frame by Clinton Bridge and Iron Works.* C-431

The wet and dry dust separating tanks thoroughly cleanse the air. The dry tank by means of centrifugal motion and gravity separates the heavier particles of dust, while the wet tank completes the process by passing the air current through the atomizer and a column of water, leaving the remaining matter in liquid suspension. The final removal of dust is simple and sanitary—from the dry tank by dumping trapvalve, and from the wet tank by drainage direct to the sewer.

It is so simple in operation that a child can intelligently operate it, as all that is necessary is to turn on the electric current to start the motor.

It is inexpensive, costing only about 8 cents per hour, and in one hour's time 200 yards of carpet can be thoroughly cleaned.

No labor is expended in taking care of it as an especially designed oiling system keeps the entire plant thoroughly lubricated for at least six months without attention.

Medical science has conceded that the majority of diseases are directly caused by germs. It is a well known fact that dust is the lurking place of the insidious germ. The question is how to dispose of dust. It is true that brooms serve to remove it to a certain extent, but the atmosphere becomes saturated with the finer particles, and this settles back into the carpets, walls, hangings, etc. The vacuum sweeper removes it thoroughly and renders dusting unnecessary.

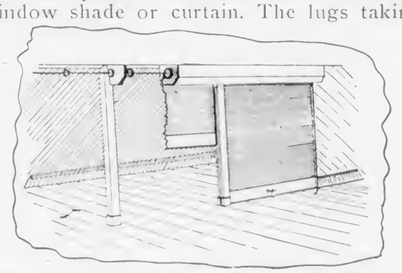
Aside from the fact that it is sanitary the process of vacuum cleaning tends to save carpets from wear. It is not the travel on a carpet that causes it to wear out, but the grinding of sand and particles of dust, which act the same as sandpaper would on a rough surface.

The time is fast approaching when all will recognize the fact that vacuum sweeping is one of the potent factors of self preservation.

❖ ❖

The Union Blind and Ladder Company, (Inc.), 328 Howard street, offer to architects and builders a perfect rolling partition. Here is what the company has to say about its goods:

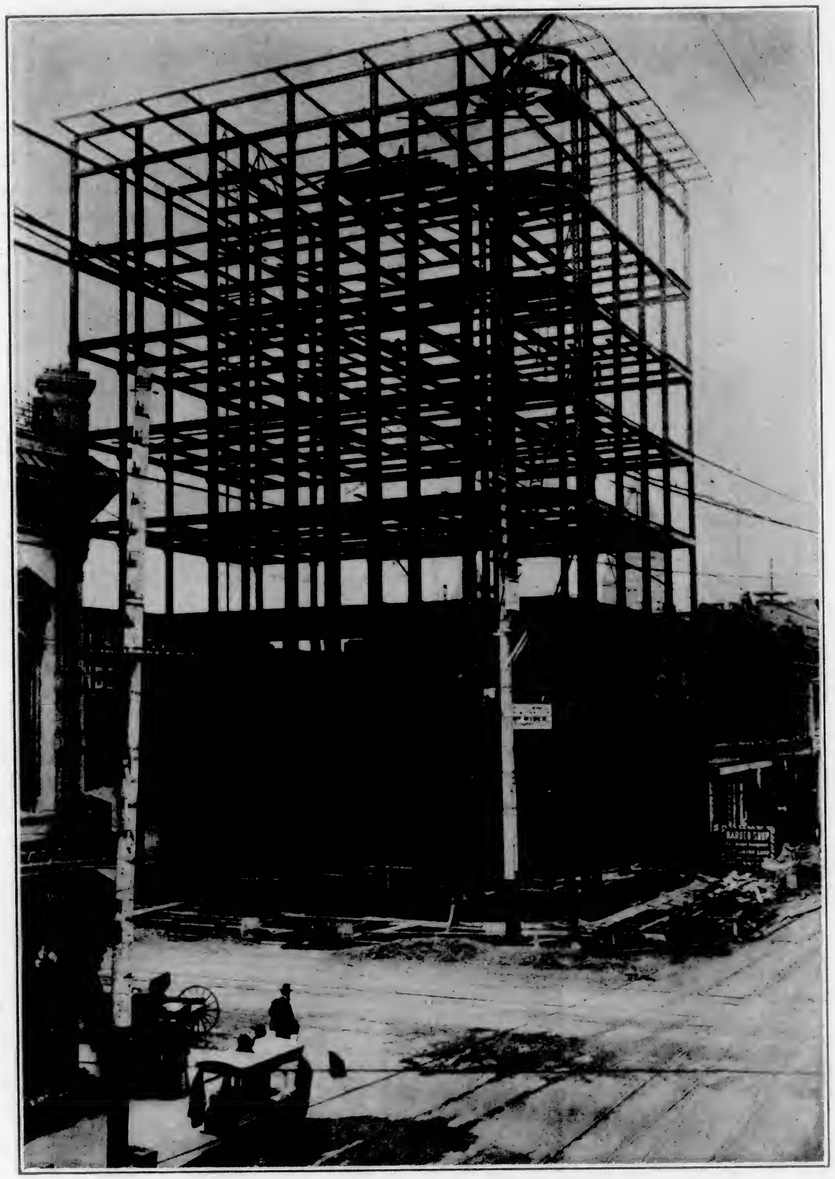
"Our Rolling Wood Partitions do away with the objectionable sliding or folding doors, which are always out of order, occupying space for pockets at the sides, thus reducing the number of desirable seats from which an unobstructed view of the platform can be had, in school-rooms, churches and halls. The partition is made of slats two inches wide, through which flat steel bands pass, fastened at the top and bottom with an adjustment to take up any shrinkage. They are held in place at the sides by grooves, and roll up and down the same as a window shade. Their application is very simple, consisting of a shaft upon which are drums containing heavy steel springs. The shafts are supported at each end by lugs, the partition is fastened to the spring drums, and with the exception of being held in place by grooves at the sides, is put up and operated the same as a common window shade or curtain. The lugs taking



the place of the shade fixtures, the shaft and drum of the roller and the partition of the cloth shade. Where they are used between class-rooms in school buildings we apply a blackboard surface of liquid slating to one side of the partition, and if necessary, furnish a hanging blackboard for the other side.

"We can cover any width opening by means of separate partitions and movable posts, which, when the partitions are rolled up, are quickly and easily removed, leaving the whole width entirely unobstructed.

"Their adaptability to churches and Sunday-school rooms can readily be seen, the floor space can be divided into any number and any size of class rooms, or when rolled up one large unbroken space obtained. Our partitions are made of white cedar, oil finish, ready for putting up. Our goods are all made in San Francisco and supplied at shortest notice."



Garden City Bank Building, San Jose. *Steel Frame by Clinton Bridge and Iron Works.* C-431

The wet and dry dust separating tanks thoroughly cleanse the air. The dry tank by means of centrifugal motion and gravity separates the heavier particles of dust, while the wet tank completes the process by passing the air current through the atomizer and a column of water, leaving the remaining matter in liquid suspension. The final removal of dust is simple and sanitary —from the dry tank by dumping trapvalve, and from the wet tank by drainage direct to the sewer.

It is so simple in operation that a child can intelligently operate it, as all that is necessary is to turn on the electric current to start the motor.

It is inexpensive, costing only about 8 cents per hour, and in one hour's time 200 yards of carpet can be thoroughly cleaned.

No labor is expended in taking care of it as an especially designed oiling system keeps the entire plant thoroughly lubricated for at least six months without attention.

Medical science has conceded that the majority of diseases are directly caused by germs. It is a well known fact that dust is the lurking place of the insidious germ. The question is how to dispose of dust. It is true that brooms serve to remove it to a certain extent, but the atmosphere becomes saturated with the finer particles, and this settles back into the carpets, walls, hangings, etc. The vacuum sweeper removes it thoroughly and renders dusting unnecessary.

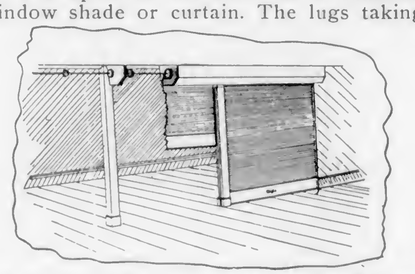
Aside from the fact that it is sanitary the process of vacuum cleaning tends to save carpets from wear. It is not the travel on a carpet that causes it to wear out, but the grinding of sand and particles of dust, which act the same as sandpaper would on a rough surface.

The time is fast approaching when all will recognize the fact that vacuum sweeping is one of the potent factors of self preservation.

❖ ❖

The Union Blind and Ladder Company, (Inc.), 328 Howard street, offer to architects and builders a perfect rolling partition. Here is what the company has to say about its goods:

"Our Rolling Wood Partitions do away with the objectionable sliding or folding doors, which are always out of order, occupying space for pockets at the sides, thus reducing the number of desirable seats from which an unobstructed view of the platform can be had, in school-rooms, churches and halls. The partition is made of slats two inches wide, through which flat steel bands pass, fastened at the top and bottom with an adjustment to take up any shrinkage. They are held in place at the sides by grooves, and roll up and down the same as a window shade. Their application is very simple, consisting of a shaft upon which are drums containing heavy steel springs. The shafts are supported at each end by lugs, the partition is fastened to the spring drums, and with the exception of being held in place by grooves at the sides, is put up and operated the same as a common window shade or curtain. The lugs taking



the place of the shade fixtures, the shaft and drum of the roller and the partition of the cloth shade. Where they are used between class-rooms in school buildings we apply a blackboard surface of liquid slating to one side of the partition, and if necessary, furnish a hanging blackboard for the other side.

"We can cover any width opening by means of separate partitions and movable posts, which, when the partitions are rolled up, are quickly and easily removed, leaving the whole width entirely unobstructed.

"Their adaptability to churches and Sunday-school rooms can readily be seen, the floor space can be divided into any number and any size of class rooms, or when rolled up one large unbroken space obtained. Our partitions are made of white cedar, oil finish, ready for putting up. Our goods are all made in San Francisco and supplied at shortest notice."

One of the most successful brass manufacturing plants on the Pacific Coast is that of the Standard Brass Casting Company on Clementina street, between First and Second, San Francisco. Although a comparatively young enterprise, being less than four years old, the company has had remarkable success and has outgrown its limited quarters, until to-day the most troublesome problem confronting its managers is the question of more room. The secret of the Standard Company's success has been its aim to produce only a high grade quality of

New Building of Globe Electrical Works, Monterey.

goods. The principal product of the factory consists of brass water goods. Practically all of the output is made from the best quality of steam metal. The works were established by J. C. Higgins and N. Alper, in 1902, beginning with a small foundry and doing jobbing work exclusively. Since then a complete finishing shop with up-to-date equipment has been installed, comparing favorably with any of the big Eastern brass goods concerns. Outside of the water goods department the company also manufactures a full line of street railway equipment, such as trolley wheels, harps, etc. The Standard people are also in a position to figure on any job of brass goods in competition with material being sent out here in large quantities from the East. The company also manufactures architectural brass and bronze work, very good samples of which may be seen on many of San Francisco's big buildings.

✣ ✣ ✣

Will Erect Plant.

An interesting item of news in the sand-lime brick industry is that of a contract recently signed between the Schwarz System Brick Company of New York and Mr. W. F. Barnes of San Francisco, for the erection of a sand-lime brick plant in the latter city. Mr. Barnes is a man well known throughout the West, having for many years been engaged in the box, lumber, basket and barrel business. These various industries naturally employ a large quantity of machinery and this has placed Mr. Barnes in a position to judge intelligently of the various merits of the different kinds of machinery offered to the sand-lime brick industry. Mr. Barnes made a tour of this country, extending from the Pacific to the Atlantic Coast, and has visited several of the plants erected by each company offering sand-lime brick machinery. The selection of the machinery of the Schwarz System Brick Company by a man of the experience and standing of Mr. Barnes is quite an additional victory for the machinery, which received the Grand Prize at the St. Louis Exposition. Mr. Barnes has been appointed the agent for the "Scientific System" for the States of Washington, Oregon, California, Idaho, Nevada, Utah, Arizona and New Mexico, and the plant which he will erect in San Francisco will undoubtedly be an important help to him in demonstrating to the purchasers in the above territory, the peculiar advantages and excellence of the Schwarz System Brick Company.

Regarding the Schwarz System the Pottery Journal of Berlin has the following:

"To scientific chemist Schwarz we must ascribe the merit of having recognized the process taking place in hardening by steam and of having now also pointed out ways and means for satisfactory manufacture of excellent calcareous sandstones. This modern process of manufacture of calcareous sandstones as worked by Schwarz is based on the following principles: The moisture and the temperature must be so regulated that undesirable chemical combinations are prevented; the hardening process must have begun evenly before pressure and be carried to such a point that the work can be performed successfully with a minimum addition of lime. A great advantage in the working of this system is the circumstance that onlv ONE machine is required for mixing the material and preparing it for pressure, whilst formerly a large number of apparata were needed for mixing and separating, as well as arrangements for conveying."

Hercules Plaster Fibre, being purely of vegetable matter, is not affected by lime and is therefore durable and will not rot or decay besides being very strong. Lime does not destroy vegetation, while it will eat and destroy anything in the shape of animal matter. Lime is used to eat the hair off the hides while preparing them for the tanning process. Hercules Plaster Fibre, not being an animal matter but a vegetable, is, therefore, not subject to the action of lime. A canvass of the most practical plasterers has resulted in the unanimous verdict that Hercules Plaster Fibre is all that is claimed for it; and prominent buildings here, such as the St. Francis Hotel, Aronson building, Third and Mission streets, Merchants' Exchange building and a host of smaller buildings, testify to the excellent qualities of this fibre. There is not a city or town on the Pacific Coast without this fibre, and it is fast gaining favor in the East, as well as in British Columbia, where American products are not strong favorites.

The plant of the Hercules Manufacturing Company is at 423-431 Ninth street, near Harrison, San Francisco, and a cordial invitation is extended to all those interested in building operations to call at the factory and see the process of cutting, cleaning, separating and final packing, ready for delivery, in small bales, each of the correct proportion to mix with one barrel of lime. These small bales are also crated fifty in

a bundle, making a neat and convenient package for shipping.

The manager of the Hercules Manufacturing Company is Mr. A. M. Sheakley, a plasterer by trade, who has devoted his life to the trade and to the perfection of the machinery used in the manufacture of this fibre.

❖ ❖

With the Sacramento Contractors and Building Crafts.

John W. Haley of 2014 Tenth street, Sacramento, is one of the best-known bricklaying contractors in the Sacramento valley. Mr. Haley has followed the trade for more than a dozen years, and has been in business for himself about half that period. Some of the most pretentious buildings in and around Sacramento have been constructed by him, including the Marshall Primary school, the Gormley building, the Odd Fellows building, the Clunie building, the Fox residence and the new home of Sacramento Lodge of Elks, now under course of construction. Mr, Haley, by the way, is a prominent member of Sacramento Lodge of Elks, and he is also Past President of Sacramento Parlor, Native Sons. One of the largest jobs undertaken by Mr. Haley out of town was the rebuilding of the Natoma Winery after its destruction by fire.

❖ ❖

Concrete construction is the coming building material, and nobody realizes this fact better than James McGillivray of 2319 G street, Sacramento. Most of the fine concrete sidewalks in the Capital City were built by Mr. McGillivray, and the concrete foundations and fire-proofing for such pretentious buildings as the Ruhstaller Brewery were put in by him. Mr. McGillivray also furnished all the mastic rock asphaltum for the brewery building. The foundations for the Sperry Milling Company's plant, the Phillips warehouse and the new W. P. Fuller building were put in by Mr. McGillivray.

From now on he will make a specialty of fireproofing, and will bid on work both in and outside of Sacramento. Mr. McGillivray is the distributing agent for the well-known Cordelia rock.

❖ ❖

The Sacramento Planing Mill and Furniture Company has been doing business in the Capital City for about three years and has worked up a reputation that some of the older planing mills of Sacramento may well look upon with envy. The material turned out by the Sacramento Planing Mill is of a high class, which probably accounts for the company's pronounced success. A specialty is made of doors, windows, screens, mouldings, brackets and turnings. The company also makes a large number of beer chests, supplying the entire output for one of the large Capital City breweries. The company has done the mill work for quite a number of pretty homes, the two cottages at 19th and H streets, shown in this number, residence of Mr. Rasmussen and the F. L. Hansen flats in San Francisco being included in the list. The company's plant is at 6th and R streets, Sacramento. Its manager is R. W. Mill and its secretary is W. G. Forrester, both wide-awake and enterprising young men.

❖ ❖

Adolph Teichert is one of the busiest cement contractors in Sacramento. His residence and office are at 2401 J street. Mr. Teichert is best know as the manufacturer of artificial stone for sidewalks, residence foundations, etc. He has been in the contracting business in Sacramento many

years. He was formerly with Goodman of San Francisco, the firm name being the California Artificial Stone Company. Mr. Teichert worked on the James Flood building in San Francisco, and on the residences of Charles Crocker, the Stanfords and the Hopkins. In Sacramento he built the "Bee" office, in so far as the cement and stone work was concerned, the John Breuner building and considerable work on the Capitol building.

❖ ❖

C. W. Dailey of 418 15th street, Sacramento, is making a specialty of store and office fittings and cabinet work. He has been in the contracting business in Sacramento for nearly a quarter of a century, and during that time has probably built close to a hundred cottages, besides many business blocks of a more or less pretentious character. He built the Mutual Supply Company's ice plant, which cost, $32,000, and which is one of the best cold storage plants in the state. He also built the Marshall Grammar school, the Singleton building, at the corner of 5th and K streets, and the Weizel building, on the opposite corner. Mr. Dailey also built the storage plant of Clauss & Krauss, on 17th street, and he has been employed in remodeling quite a few business houses and churches.

❖ ❖

Fifteen years a bricklayer and brick contractor, is the record of George L. Herndon of 914 T street, Sacramento. A native of that city, Mr. Herndon has grown up with the town, and few men in the building trades are better known than he. He is a member of Sacramento Parlor, Native Sons, and is also a Red Man. Recently he was given the contract for the brick work on the new Red Men's Hall, to be erected in Sacramento this spring at a cost of $40,000. Among the buildings erected by Mr. Herndon in the past few years is the Ruhstaller Brewery, the Corporation House, the Morehead building at Chico, brick building for Belfour, Garret & Co., at Grimes' Landing, Colusa County, and a sherry house for J. B. Bradford & San at Bruceville. One of the most recent structures to be completed by Mr. Herndon is a 250-foot store building at Auburn from plans by Architect T. Patterson Ross of San Francisco. Mr. Herndon was at one time foreman for Thomas Whitehead, contractor for the Southern Pacific Company, in the Pacific Improvement Company's work.

❖ ❖

The Palm Iron Works at Sacramento supplies practically all the iron and steel work for the big buildings in and around the Capital City. The company has lately moved into its new building at 15th and K streets and is now in a position to handle big orders at short notice. Besides ornamental and structural iron and steel the company does a large business in iron doors, grating, fences and wire work of all kinds. Mr. Palm was the lowest bidder for the iron and steel work on the State house, which is shortly to be fire-proofed and strengthened from plans by Sutton & Weeks of San Francisco.

❖ ❖

G. Edward Hook, successor to Hook & Son of Sacramento, is acquiring quite an enviable reputation as the builder of residences and bungalows. He is making a specialty of this line of building. Mr. Hook has erected a number of houses, built partly of shingles and partly in rustic effect, and this class of homes has proved especially popular. Besides residences, Mr. Hook

does quite a little work in flat building and store and office fitting.

The following is a partial list of last year's building by Mr. Hook: H. C. Keyes, residence, M, 24th and 25th streets; Chas. Mier, bungalow, 16th, M and N streets; Geo. Hignett, four apartment house, 12th and O streets, two flats, 12th and O streets; Chas. F. Howland, ten-room residence, J, 28th and 29th streets; William Greene, six-room, shingle and rustic, two-story cottage, 23d and P streets; Dr. Chas. Van Norden, $7,000 bungalow on Aeolia Heights, Auburn, Placer county, Cal.; Mr. O. C. Schultze, residence in Dixon, Solano county, plans drawn by R. A. Herold.

❖ ❖

Sinclair & Bessey of 513 J street, Sacramento, architectural sheet metal workers, furnace men and ventilating engineers, hold the foremost position in Northern California in their line. The firm's large plant enables them to undertake and complete work of no small magnitude. Up-to-date specifications embody many features unknown to the trade twenty-five years ago, wood and cement ornamentation being replaced with artistic designs in galvanized iron, copper and zinc. The architect must have implicit confidence in the ability of the metal worker to appreciate and carry out the detail of the work. Sinclair & Bessey enjoy the reputation for correctness in interpreting the architect's plans and carrying out the work satisfactorily. During the past five years this firm has finished the metal work on the following buildings in Sacramento: Capitol Hotel, Gormley building,

Corporation House, Odd Fellows' Temple, Turner Hall, and the Odd Fellows' Hall, Lincoln. To have completed such work for a gentleman of Mr. Herold's exacting superintendence is a sufficient testimony that Sinclair & Bessey have the undoubted ability to handle work intelligently and practically. This firm has inaugurated a special department to handle the heating and ventilation of buildings, and their long experience enables them to give the best results.

❖ ❖

T. J. Pennish of 830 Q street, Sacramento, is a very busy man these days. He is doing all the plastering in the big Elks' building, as well as the addition to the Capitol Hotel. Mr. Pennish does both plain and ornamental plaster work. He has had twenty-five years' experience. He has done so much work in and around the Capital City that to enumerate it would fill more than a page of this magazine. Turner Hall, a recently completed structure in Sacramento, was plastered by Mr. Pennish. His work has always given satisfaction, which accounts for his remarkable success as a plastering contractor.

C. J. Mathews, successor to Miller & Mathews, is another of Sacramento's popular contractors and builders. Many buildings in the Capital City have been put up by him, and just now he is kept busy on large jobs outside the city. He has probably done more building outside of Sacramento during the last few years than any other one contractor in the Capital City, and it has all been of a high standard, too.

❖ ❖

"Perfect satisfaction guaranteed" is the motto of Siller Bros., contractors and builders, whose office and mill are at 1614 13th street, Sacramento. The firm furnishes estimates on all kinds of building, besides general jobbing and mill work. Members of the firm are J. L. Siller and L. G. Siller, both veteran contractors. The Capitol building, Turner Hall and Odd Fellows' building are among the many structures put up by this firm.

❖ ❖

T. I. Brennan of 920 J Street, Sacramento, has almost the exclusive trade of the Capital City in tile floors, mantels and grates. Mr. Brennan has been in the tile business for the past fifteen years, and his friends say that what he doesn't know about it isn't worth knowing. Prior to going into business for himself three years ago, he was employed by the Havener-Mier Company. Since going into business for himself he has done practically all the tile work in Sacramento. His wood, brick and tile mantels are noted for their artistic design.