

\$2500.00 and no more, without any reference whatsoever to the awarding or payment for same.

Is it not time that something should be done to protect the profession from such insults as this?

I have no doubt whatever but that they will receive designs from "Contractor Architects" and will not be surprised if some architects went in for it. A SUBSCRIBER.

THE STRENGTH AND RESILIENCE OF CAST IRON.

BY PROF. J. B. JOHNSON.

THE working qualities of structural castings are of extreme importance, so much so that the necessity for these qualities goes without saying. Furthermore, these qualities can be tested, and are tested, of necessity, in the finishing of the castings for service. Any failure of the working qualities is immediately discovered by the machinist and corrected by the foundryman. The strength and the toughness of the castings, however, are two qualities which are not unusually determined at all except by such incidental indications of strength and toughness as come from the breakage of these parts in practice under loads or shocks which they were assumed to be able to resist.

The most convenient form for a test specimen of cast iron for cross bending is a rectangular cross section about twenty-four inches long. The size of the cross section should have some relation to the thickness of the webs or parts in the structural forms into which the metal is run and for the strength of which the tests are made. Thus, if the iron is to be used in forms where the thickness of the metal is about one inch, the test specimen should be made about one inch square. If, however, the metal is to be used in parts the thickness of which is not more than $\frac{1}{2}$ inch then it would be well to make the test specimens $\frac{1}{2}$ inch thick and perhaps $1\frac{1}{2}$ to 2 inches wide.

In testing such a bar it should be supported on knife edges near the ends, these knife edges being at a definite distance apart. This specimen is then broken by placing a load at the center, preferably by means of another knife edge, and this load applied slowly and uniformly and without shock. About the only way to do this properly is by means of a screw turned steadily and very slowly. The modulus of rupture of cast iron in cross breaking corresponds to the tensile strength of the iron, and if the iron were perfectly elastic up to the point of rupture this modulus of rupture would be the same as the tensile strength in pounds per square inch; but since cast iron takes some permanent set before it breaks, the theoretical formula no longer applies, so that the computed modulus of rupture, as determined from cross breaking tests, is found to be always very much larger than the true tensile strength of the cast iron, its average value being from one and one-half to twice as much as the strength per square inch in tension. If the cast iron has a tensile strength of 20,000 pounds to the square inch, its modulus of rupture in cross bending will be, therefore, from 30,000 to 40,000 pounds. It is common to assume that a tensile strength of 20,000 pounds corresponds to a cross breaking strength, or modulus of rupture, of about 36,000 pounds per square inch. To find this modulus of rupture from a cross breaking test on a rectangular bar we use the following simple formula:

$$f = \frac{3}{2} \left(\frac{W l}{b h^2} \right)$$

where f =modulus of rupture in cross bending in pounds per square inch; W =load at center of beam in pounds; l =length of beam between bearings in inches; b =horizontal breadth of beam in inches; h =vertical height or depth of beam in inches.

It is much better to use this formula and compute f from the cross breaking weight W , and the dimensions of the bar b , h and l , than to use some thumb rule, as for instance, that a bar 1 inch square and 12 inches long should carry a load of 2000 pounds at center. This would give a modulus

in cross breaking of 36,000 pounds, which indicates a very fair quality of cast iron, so far as strength is concerned; but if the specimen should prove to be a little more than 1 inch square, or a little less, there is nothing in the specification to show by how much the loads should vary to compensate for this change of size. Whereas, if it be specified that the modulus of rupture should be 36,000 pounds, that could be determined from the above formula very easily, whatever the dimensions may have been. In fact, b and h should always be measured to the nearest 1-100 inches, and, of course, the castings could not be made of any given size to anything like this degree of accuracy.

In all cross-bending tests of cast iron some means should be provided for accurately measuring the deflection of the bar up to the point of rupture. This can only be properly done by the aid of some kind of attachment to the testing machine itself. These deflections should be measured to the nearest 1-1000 inch. The use of the deflection is to enable us to compute the resilience or elastic spring of the iron, as will be explained below.

Resilience signifies the toughness or the ability of the material to resist a shock or blow. Thus, if the total breaking load be multiplied by the total deflection of the beam, and this product divided by two, the result is the resilience of the beam in inch-pounds, provided the load were measured in pounds and the deflection in inches. This product varies directly with the form and volume of the beam, irrespective of its dimensions, so that if the half product be divided by the total number of cubic inches in the beam, the result represents the resilience of the iron for a rectangular beam in inch-pounds per cubic inch of metal. This is an absolute measure of the resilience or toughness of the iron, but it is easier to weigh the specimen than it is to compute its volume in cubic inches. Hence we may find the resilience of a rectangular beam per pound of metal by dividing the total resilience by the number of pounds in the specimen, just as before we found it per cubic inch by dividing by the number of cubic inches in the specimen. The writer prefers this latter method, and therefore he recommends the following:

Rule.—Multiply the breaking load in the middle of the beam by its deflection at the time of rupture, and divide the product by twice the weight of the beam in pounds.

The result should not be less than 20 for ordinary cast iron, and may be as high as 50 for the best quality of refined cast iron, such as is commonly known as gun metal.

In all tests of cast iron in tension the specimen should be cast round, free from all defects, and then turned down in a lathe throughout its entire length, the middle portion being reduced to a somewhat smaller diameter than the ends. Such a specimen can only be broken upon a regular tension testing machine, such as few foundries have in their outfit, and hence these tests are not so well adapted to common practice as the cross-breaking tests described above.

Several concerns manufacture cross-breaking testing machines which give indications of the deflection, such as are required in the application of the rule given above for determining resilience. In these tests it is very necessary that the load be put on slowly and with perfect uniformity, and this is accomplished in all these machines by means of a screw.

It must be noted that both the strength and the resilience can be determined from the same test. Having measured the length, breadth and height of the bar, and determined the breaking load, we can compute the breaking strength as described above; also having weighed the bar and determined its breaking load and its deflection, the resilience in inch-pounds per pound of metal can be determined so that a single test in cross-breaking fixes both the strength and the resilience or toughness of the iron. It must not be forgotten that these two qualities are entirely distinct and must not be mistaken the one for the other. Thus, one mixture may be very strong and brittle, and another comparatively weak but very high in resilience. It is not impossible, however, to obtain both great strength and high resilience from the same mixture, and this, of course, is the ideal kind of cast iron. Such iron offers the greatest resistance, both to dead loads and heavy strains, and also to such shocks and blows as it may receive either in actual practice or from some accident.—*Age of Steel.*

NOTICE OF MEETINGS.

SAN FRANCISCO CHAPTER, AMERICAN INSTITUTE OF ARCHITECTS, meets second Friday of each month at 408 California street.
 SETH BALSON, Pres. GEO. W. PERCY, Vice-Pres.
 OLIVER EVERETT, Sec. JOHN M. CURTIS, Treas.

TECHNICAL SOCIETY OF THE PACIFIC COAST, meets first Friday of each month at Academy of Sciences Building.
 C. E. GRUNSKY, Pres. GEO. W. DICKIE, Vice-Pres.
 OTTO VON GELDERN, Sec. W. C. RALSTON, Treas.

CALIFORNIA ELECTRICAL SOCIETY, meets the first and third Monday evenings of each month at the Academy of Sciences Building.
 GEO. P. LOW, Pres. C. O. POOLE, Vice-Pres.
 MAX CASPARI, Sec. H. T. BESTOR, Treas.

THE ANNUAL MEETING OF THE SAN FRANCISCO CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE Annual Meeting of the San Francisco Chapter of the American Institute of Architects was held Friday afternoon, September 14, 1894.

The following officers were elected to serve during the coming term:

Seth Balson, President; Geo. W. Percy, Vice-President; John M. Curtis, Treasurer; Oliver Everett, Secretary, and Messrs. Jas. W. Reid, Albert Pissis, Willis Polk, Edmund Kollofrath and Geo. H. Sanders as Trustees.

Mr. Percy of the Committee on Fire Ordinances reported progress and promised a full report for the October meeting.

The Chapter unanimously passed a vote of thanks to Mr. Alfred Colin, for his services in instructing the Chapter's Classes in Drawing and Design.

An amendment to the By-Laws was presented by Mr. Sanders, concerning the withdrawal of moneys in bank.

A communication was received from the Washington State Chapter, but owing to the lateness of the hour, it was laid over for consideration at the next meeting, and ordered printed in the official organ of the Chapter, for the information of absent members.

Following is the communication in full:

SEATTLE, WASH., AUG. 14, 1894.

Mr. Oliver Everett, Secretary San Francisco Chapter American Institute of Architects, San Francisco, Cal.

DEAR SIR:—By instruction of the Washington State Chapter of the A. I. A., I enclose you herewith copies of Resolutions and Addenda to Resolutions, which were passed by our Chapter at its regular meeting held at Tacoma, in July. These resolutions were sent to Mr. Alfred Stone, Secretary of the A. I. A., and in his letter to us of August 1st, he writes that he will submit the same to the Committee of the Institute appointed for the purpose of procuring the passing of the bill now before Congress for a reform in the methods of designing and constructing buildings for the United States Government.

In regard to the Addenda to the Resolutions, Mr. Stone comments as follows: "We think that in order to secure

what you ask for, to wit: that only bona fide residents of, or voters in, a state shall have the designing of buildings within such state, it will have to be urged upon the Commissioners appointed under the new bill for it will be useless to attempt to make any amendments to the present bill, as it would probably endanger its passage, and we are now in hopes that it will be passed at this session of the present Congress."

Our Chapter disagrees with Mr. Stone in this, that by restricting the competition to architects within the state or territory in which the Government building is to be constructed, it will appeal more directly to each Senator and Representative throughout the country when he can see his own constituents more directly benefited. In a general open competition the West would be at considerable disadvantage, and in most cases, would scarcely be able to compete for Government buildings unless meetings of the Commissioners should be held in the states where the buildings were to be constructed, and even then there would be danger from the



usual result of competitions in favoritism shown through influence or friendliness towards a clique.

We would be glad of an expression from your Chapter in this regard whether you will co-operate with us in urging what seems to us a very important amendment to the bill now before Congress rather than to leave it to the Commissioners after its passage.

Very truly yours,
 CHARLES W. SAUNDERS.

Secretary of Washington Chapter A. I. A.

RESOLUTIONS:

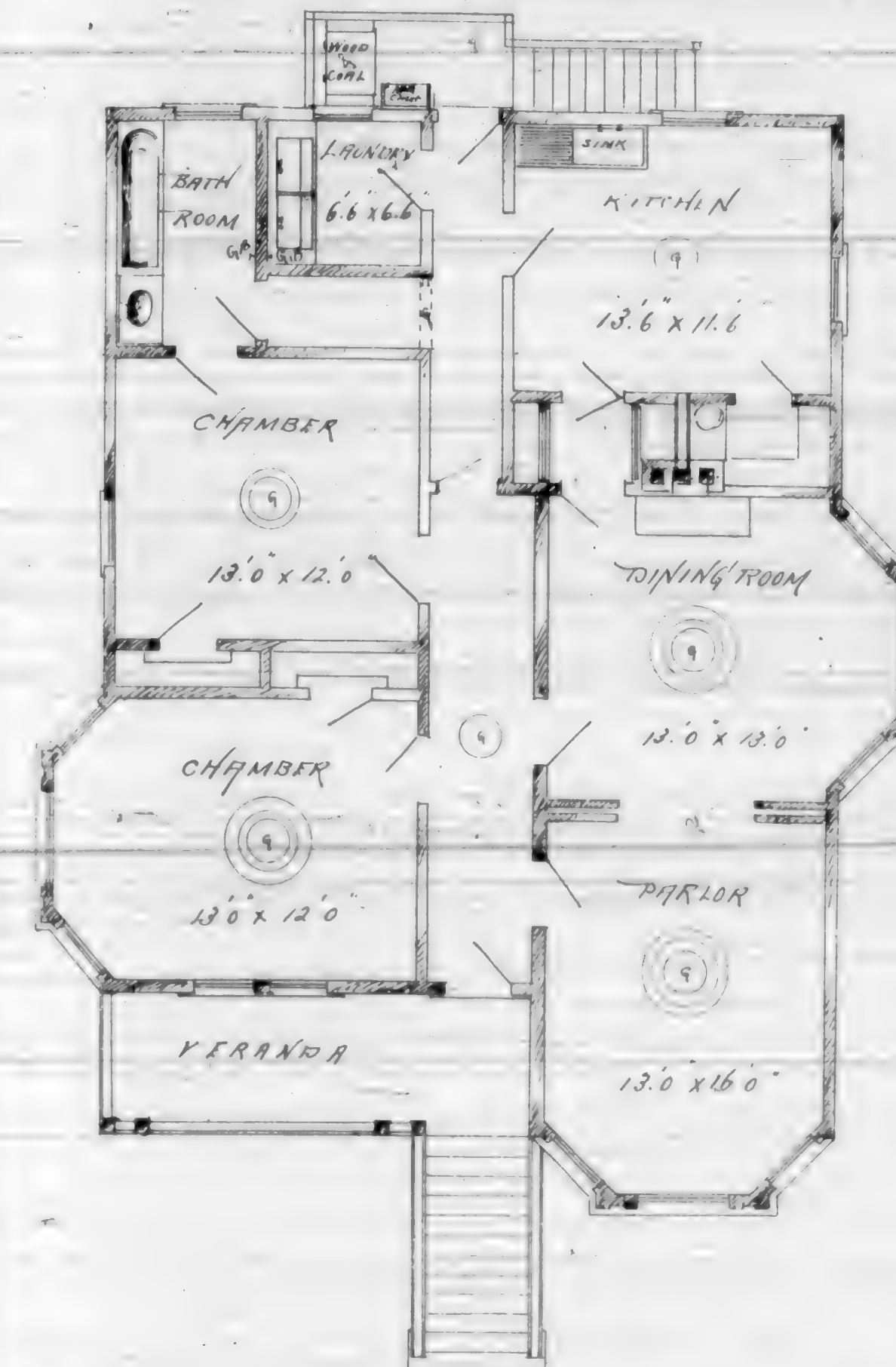
WHEREAS—The peculiar manner in which the office of the Supervising Architect of the Treasury is carried on, yields architectural results in the planning and designing of the Government Buildings which suffer in comparison with the private architecture of the country, and are costly, inferior not only to the best contemporary private structures, but to the average ones, and

WHEREAS—The American Institute of Architects, and members of the profession who do not belong to that body, together with many others who are deeply interested, have been trying for years to bring about a reform in the methods

of designing and constructing buildings for the United States Government; therefore, be it

RESOLVED—That the Washington Chapter of Architects hereby pledges itself to second the action of the American Institute, faithfully and persistently, in efforts to obtain this reformation, in order that the Government shall have its work done at the same price that individuals pay, and by means of a service more able and skillful; to contribute to the erection of structures which shall not debase public taste; and that the Architects of the State of Washington unite in petition to their members of Congress, respectfully asking their advocacy of such legislation as is necessary to secure this result.

An Addenda to the above Resolutions, submitted by Mr.



Wickersham was adopted by vote, and the Secretary was instructed to submit it and the original Resolutions to the Senator and Representatives in Congress and to the California Chapter American Institute of Architects.

ADDENDA TO RESOLUTIONS.

All competitions for procuring plans, etc., for Public Buildings of the United States Government shall be confined strictly to the Architects who are bona fide residents of and voters in the State in which the said Public Building of the United States Government is to be erected. And the members of the Washington State Chapter of Architects, together with many that are not members, believe that the foregoing resolution, if incorporated in a statute law, will be just and equitable and of great benefit to the Architectural profession throughout the country, in this: that the architects of each state will be given an equal opportunity to dis-

play their skill and ability, in the erection of structures that should be a credit not only to the State and Nation, but to the Architectural profession as well; that the possibility of all, or nearly all, the public buildings of the United States Government being controlled by a clique or ring, would be reduced to the minimum; therefore the members of the Washington State Chapter of Architects and others, respectfully request and strongly urge that a clause embodying the foregoing resolution, be incorporated in and made a part of any bill that the American Institute of Architects has already placed or purposes placing before Congress for enactment.

Acknowledgements were ordered sent to the Rhode Island and Colorado Chapter, for copies of By-Laws of the respective chapters.

Upon motion of Mr. Bestor, the President was authorized to appoint four permanent committees on the following subjects:

The Architectural History of San Francisco and the Pacific Coast.

Statistics of Building Interests Including the Growth of Industries.

Antiquities of the Pacific Slope.

Modern Construction for Various Purposes.

LEGAL DECISIONS:

From a large number of Legal Decisions of the higher Court, of the different States of the Union, we select and publish in this column, such as appear applicable to this section of the country.

EFFECT OF VOID CONTRACT.—Where a contract is void for failure to file with the contract in the recorder's office the plans and specifications, the lienors are entitled to recover the full value of the materials furnished, irrespective of the contract price.

Dunlop v. Kennedy, Supreme Court of California, 36 Pac. Rep. 765. 42.

ACCEPTANCE BY ARCHITECT NOT CONCLUSIVE ON OWNER.—Where a building contract stipulates that the materials shall be of a certain quality, and that the work shall be performed in the best manner, subject to the acceptance or rejection of the architect, all to be done in strict accordance with the plans and specifications, and to be paid for when done completely and accepted, the acceptance by the architect of a different class of work or of different materials will not bind the owner as the provision for the acceptance by the architect is merely an additional safeguard for the benefit of the owner.

Lewis v. Yagel, Supreme Court, General Term, Fourth Department, 26 N. Y. Supp. 833. 102.

WHEN RECOVERY MAY BE HAD FOR EXTRA WORK.—A building contract which provides that no work shall be considered as extra unless a separate estimate in writing shall be submitted by the contractor to the architect and the owner, and their signatures obtained thereto, does not preclude a recovery for extra work done under a verbal agreement between the contractor and the owner.

Lewis v. Yagel, Supreme Court, General Term, Fourth Department 26 N. Y. Supp. 833. 63.

CONSENT OF OWNER NECESSARY TO CHARGE PROPERTY.—Where a lease contains no covenant by the lessee to repair, knowledge on his part that the premises are being improved under a contract with the lessee and acquiescence therein, does not constitute the consent required by the mechanic's lien law to charge the property.

McCauley v. Hatfield, Supreme Court, Special Term, Kings County, 28 N. Y. Supp. 648. 53.

RELEASE OF SURETIES OF CONTRACTOR'S BOND.—Sureties on a bond conditioned for the erection, in accordance with certain plans and specifications, and keeping in repair, of bridge, abutments, are released from liability by a substantial change in the plans of the work, made by the principal, and accepted by the obligee of the bond, without their knowledge or consent.

Morgan County v. McRae, Supreme Court of Kansas, 36 Pac. Rep. 717. 62.

A SIMPLE SYSTEM OF FILING CLIPPINGS.

EVERY engineer and reader of the trade journals recognizes the value of clippings and scraps taken from them, and appreciated as well the difficulty of collecting and classifying such data conveniently and so it may be readily got at for reference. Mr. Spencer Miller, engineer of the Lidgerwood Manufacturing Company, 96 Liberty street, New York city, employs a simple solution of the difficulty in a specially designed scrap cabinet and system of filing, which was described at the recent meeting before the American Society of Mechanical Engineers in Montreal, Canada. The cabinet consists of one large drawer for "miscellaneous scraps," another of the same size for a "stock drawer," two shelves for scrap books and a series of smaller drawers of uniform size. In clipping, the scraps are thrown as cut into the large "miscellaneous scrap" drawer, from which they are assorted at leisure and placed in the series of smaller drawers, each under its proper head. There are as many of these drawers as there are subjects desired to be covered.

A drawer at a time is then taken in hand and the clippings trimmed to the minimum size and pasted upon sheets of paper perforated on one edge and of uniform size.

The clippings of course are pasted only upon one side of the sheet, with date and name of publication attached. When there is a sufficient number of these sheets they are assembled in proper order in the form of a scrap book, with cover (being stapled or fastened together with thread), and these are put upon the shelves of the cabinet for reference.

By this system it will be noticed that at no time are the clippings in any form in which they cannot be easily found, neither is there any time when the books may not be rearranged. For this reason it is found better not to page the books.

The size of the sheets used in making up the books is optional with the user. Mr. Miller uses 8 1/2 x 11 inches, manila paper such as is ordinarily found in the best scrap

books being preferred. Each sheet is cut with a separating strip or stub 1 x 11 inches pasted on one edge of the same, being perforated with four holes placed at equal distances. This keeps the book from widening at the opening side. The covers are made 9 x 11 1/2 and have a neatly-stamped title. They are made still, with a flexible joint one inch from the binding edge.

The large drawers are 3 inches deep. The inside dimensions of the smaller drawers are 10 x 11 1/2 inches, which will allow the finished books to be dropped in if desired. One of the difficulties which arise usually to all who have a love for clipping and collecting scraps occurs when an immense amount of clippings have been collected and one feels a desire to cull. The system used by Mr. Miller permits culling better it would seem than any other. A dozen sheets may be torn out of a book and the hole can be simply closed up, and their absence is never noticed.—*Stone.*

TO MOUNT PHOTOGRAPHS WITHOUT BUCKLING.

THE satisfactory mounting of photographs is a troublesome operation, and the following suggestion from a contributor to the *Outlook* may be of assistance to amateurs: I have found a method by which a photograph or engraving can be mounted on the thinnest paper without curling or wrinkling. If the picture is a photograph it should be ironed out smooth with a hot iron and then trimmed. Mix a little gum arabic in hot water, so as to make a rather thick mucilage. Place the picture on the page in position and mark just inside the corners. Remove the picture and take some of the mucilage on a ruling pen and draw a heavy line of mucilage from one point to another, so as to make a line of mucilage all around the place where the picture is to be. As soon as the mucilage is sticky put the picture in place a book over it to keep it flat. When dry you will have a smooth mount that will not curl.

BUSINESS MOSAICS.

California Art Glass Works have removed from their old stand 39 1/2 Fremont street to new quarters 156 Mission street. We hope to be able in our next number to give a description of their new works, which we understand are well worthy of inspection and description. Mr. Schroeder, the president of the company will be pleased to show his patrons new designs, which can be seen to better advantage in his new place of business.

Tommy—"Paw, what makes them have the weather office away up on the top of a high building?" **MR. FIGG**—"That is so that it will be too much exertion for a fat man to climb the stairs and kill the weather man."—*Indianapolis Journal.*

We have before this had occasion to call the attention of our readers to the good quality of Schenck's Swinging Hose Reel and wonder that any of our factories, hotels and buildings can afford to be without, if there are such let their owner think the matter over for a second time, second thought is always the best, and then go and secure an almost certain protection from the all devouring flames that from time to time sweep away the accumulation of a life time. All the hose and apparatus supplied by W. T. Y. Schenck are fully guaranteed to be what is represented. A call at 593 Mission street near Second street, will convince any one in search of protection from fire that they can find what they want and find it of the very best quality.

The dainty designs for bathing furnished by The J. L. Mott Iron Works, would almost tempt one to refrain from the sea-side; when in want of a bath, a room furnished in the latest style with all the plumbing accessible and wherever possible without cabinet work, is surely a room where one can enjoy either a hot or cold plunge with far more comfort, and far less expense than at the sea-side. Ask Mr. M. S. James the Pacific Coast representative of these works, room 35 Flood building, if this is not true and at the same time obtain from Mr. James information and circulars to give your friends who may not know all about it.

Fond MOTHER—"Yes, sir; I have a little fellow who is only ten, and yet he writes beautiful poetry." **OLD EDITOR**—"Well, there's some hope for 'em when you catch 'em young; you can whip it out of 'em easier then."—*Atlanta Constitution.*

Heating and Ventilating.—Wright & Olsen will furnish estimates for heating any size of building by steam, hot water or warm air; also sole agents of Magee Furnaces and Ranges, Barler's Ideal Heaters, Dr. Buckley's Water Purifier, as well as Wright's Fire Place Heaters for heating by hot water, this latter contrivance is well worthy of special notice, as a number of rooms can be heated by an ordinary fire. Call at 27 New Montgomery street, and you will not regret the time spent in the examination of the good things on the way of keeping warm that you will find there.

Merchant & Co's. Star Ventilator.—The claim for this ventilator as being above all others in scientific and functional advantages, appears well founded; being durable, noiseless and storm-proof while all down draughts are prevented. Oscar S. Levy agent for Merchant & Co. can be found at 205 Market street, San Francisco, Cal.

Mother (at a party)—"Why did you allow young Sap-head to kiss you in the conservatory?" **DAUGHTER**—"Why maw?" **MOTHER**—"Oh, you needn't 'why maw' me. One side of his nose is powered and one side of yours isn't."—*N. Y. Weekly.*

Fitzgerald Prepared Wall Plaster.—As the desire of good walls for your home becomes more common, the demand for this Plaster increases. Nothing like the increase of business to show that satisfaction is given; those that use it once are sure to advise their friends to do the same, and this undoubtedly accounts for the increased demand of Fitzgerald Prepared Wall Plaster. If you call at the office of the company 216 Bush street, San Francisco, you can inform yourself all about its merits.

MR. HAYSEED (in city hotel)—"Wall, I guess you'll have to blow out the gas, Mandy." **MRS. HAYSEED**—"Why Josiah? The porter made me promise not to do it."—*Life.*

If you want anything in the line of house building, or indeed of almost any other line, go to Smith & Young, you are almost sure to find what you want. Blue prints and paper to make them on, wood carvings as well as pressed wood ornaments, mineral wool and sheathing papers, infusorial earth and Bostwick steel lath, painted and unpainted, are among the stock that is always on hand to be found at either their store 723 Market street, San Francisco or 230 South Spring street, Los Angeles. See page ix of this journal for their advertisement.

He—"What is he going to do after he graduates?" **SHE**—"Wouldn't it be more appropriate to ask, 'Whom is he going to do?'"—*Truth.*

If you are interested in brick it would do your heart good to see the barge loads of brick arriving at the yards of the San Joaquin Brick Co. from their works in Stockton, Cal. A visit to the company's yard in this city on Berry street between 6th and 7th would make you think our city was about to be rebuilt with brick.

When you want anything in the line of artificial stone, concrete, sidewalks or garden walks don't forget that George Goodman does everything in this line and does it well, what more can you ask as you are sure of getting a good job at a fair price if you go to his office, 307 Montgomery street, Nevada Block, San Francisco. See his advertisement on page ix of this journal.

"What did you do with that check your father-in-law gave you for a wedding present?"—"Had it framed; no one would cash it."—*Boston Gazette.*

F. H. Rosenbaum & Co., 567 Market street are always on hand to supply your wants in the way of plate and window glass—also manufacturers of mirrors, both quicksilver and patent backs, as well as ornamental cutting and beveling in all its branches.

Visitor—"Where is your mamma?" **LITTLE GIRL**—"She has gone out for five minutes two hours ago."—*Buffalo Commercial.*

The Pacific American Decorating Company have something well worthy the attention of those inclined to decorate their residences with landscapes, marine views, photographs of persons, animals, etc., by the Hyroscopic process, any thing from the works of the old masters, to the latest fad of the amateur photographers can be reproduced upon glass in a manner that will please and astonish any one who examines the work done by this firm, thus opening a vast field for every one to display his artistic taste in the decoration of his own hall. Call and see their work and be convinced of the great possibilities before you. C. S. Chadbourn, Pres. Peter L. Mallon, Vice-Pres.; John Mallon, Sec.

Teacher—"They builded better than they knew. Do you understand that?" **BRIGHT BOY**—"Yes'm; they always do." **TEACHER**—"Who always do?" **BRIGHT BOY**—"The architects, you know. Pop's new \$5,000 house cost most \$10,000."—*Good News.*

The removal of the office of the San Francisco Slate Company from their former rooms in the Mills building to 415 1/2 Montgomery street, between California and Sacramento streets, reminds us to state that the California slate supplied from their quarries in El Dorado County is of a quality superior to any in the market, and at the same time the cheapest, if you do not agree with us on that point call at their new office and become convinced that it is so.

CITY BUILDING NEWS.

Broadway near Leavenworth. To build; owner, Patrick Kilduff; architects, Shea & Shea; contractors, Magner & Gallagher; signed, Aug. 30; filed, Sept. 1; cost \$2835.

Broadway near Leavenworth. To build; owner, A. Buchegnani; contractor, L. Cuneo & G. B. Cavanagh; filed, Aug. 8; signed, Aug. 8; cost \$3000.

Broadway near Pierce. To build; owner, Charles L. Patton; architect, W. H. Hamilton; contractor, M. J. Savage; signed, Aug. 28; filed, Aug. 31; cost \$4081.

Broderick near Golden Gate Ave. To build; owners, Jas. and Ellen Gallagher; architect, C. J. I. Devlin; contractor, R. Van de Pavert; signed, Aug. 13; filed, Aug. 14; cost \$3302.

Bush and Stockton. Carpenter and mill work; owner, City of San Francisco; architect, C. I. Havens; contractor, H. Whittle; signed, Sept. 5; filed, Sept. 8; cost \$4990.

Bush and Stockton. Three-story brick school; owner, City of San Francisco; architect, Chas. I. Havens; contractor, Henry Whittle; signed, Aug. 10; filed, Aug. 16; cost \$15,275.

- Brannan near 4th. Concrete work to Saint Rose Church; owner, Rev. D. Nugent; architect, J. J. Clark; contractor, S. Giletti; signed, Aug. 15; filed, Aug. 16; cost 12 cts. per cubic foot.
- Castro near Alvarado. To build; owner, Robert Irwin; contractor, W. W. Rednall; signed, Sept. 4; filed, Sept. 5; cost \$1750.
- Conitland Ave. and Buena Vista. To build; owner, D. Masornad; architect, G. A. Berger; contractor, D. Currie; signed, Aug. 20; filed, Aug. 21; cost \$3875.
- Davis, Pacific, Frontland Clark streets. Market building; owner, E. Henrietta, Jr. and John Telle; architect, Clinton Day; contractor, J. T. Grant; signed, Aug. 8; filed, Aug. 11; cost \$50,000.
- Davis near Washington. All work for foundation; owner, Isaac Kohn; architects, Pissis & Moore; contractors B. McMahon & Sons; signed, Aug. 6; filed, Aug. 16; cost \$2800.75.
- Davis near Washington. Removing buildings, etc.; owner, Isaac Kohn; architects, Pissis & Moore; contractors, Gray Bros.; signed, Aug. 13; filed, Aug. 16; cost \$2610.
- Devisadero near McAllister. Plumbing; owner, E. Happersberger; contractor, W. E. Wilson; filed, Aug. 13; cost \$2282.
- Devisadero near McAllister. All work except plumbing; owner, E. Happersberger; contractors, Schutte & Kreeker; signed, Aug. 13; filed, Aug. 13; cost \$11,225.
- Devisadero near McAllister. Painting; owner, Emil Happersberger; architects, Kenitzer & Barth; contractor, J. S. Thomson; signed, Aug. 29; filed, Sept. 5; cost \$1325.
- Dolores near 29th. To build; owner, J. O'Connor; architect, M. J. Lyon; contractors, J. Conway & Leahy; signed, Sept. 4; filed, Sept. 13; cost \$2600.
- Ellis near Scott. To build; owner, Robert Alther; contractor, H. Rohling; signed, Aug. 20; filed, Aug. 20; cost \$5400.
- Eddy near Steiner. Alterations and additions; owner, James Reinbin; architect, A. C. Luigens; contractor, Wm. Lipden; cost \$2043.
- Eleventh Ave. near Clement. One-story frame; owner, W. H. Green; architect, F. Mead; contractors, W. H. Mead & G. C. Nall; signed, Sept. 8; filed, Sept. 8; cost \$1750.
- Fillmore near Union. To build; owner, Patrick Lynch; contractors, W. H. Stevens & E. Woods; signed, Aug. 10; filed, Aug. 10; cost \$2000.
- Folsom street wharf. All work on coal bunkers; owners, Dunsmuir & Sons; Engineer, H. C. Holmes; contractors, Pacific Bridge Co.; signed, Aug. 4; filed, Aug. 7; cost \$27,125.
- Folsom corner of Army. To build; owner, H. Drewes; architect, R. A. Van de Paver; signed, Sept. 1; filed, Sept. 5; cost \$2325.
- Folsom near Fifth. To build; owner, Mrs. Catherine Borden; architect, B. J. Clineh; contractors, Doyle & Son; signed, Sept. 3; filed, Sept. 6; cost \$4700.
- Fourth and Point Lobos Aves. All work except painting and plumbing; owner, Chris. Bunker; architects, Martens & Coffey; contractor, J. J. O'Brien; signed, Aug. 2; filed, Aug. 22; cost \$4500.
- Fulton near Lyon. A residence; owner, First United Presbyterian Church; architect, Wm. Curlett; contractors, McCulloch & Glouz; signed, Aug. 14; filed, Aug. 21; cost \$3285.
- Filbert near Webster. To build; owner, John Gianini; architects, Pissis & Moore; contractors, Coella & Cahelli; signed, Aug. 30; filed, Sept. 3; cost \$2450.
- Frederick near Clayton. Cottage; owner, W. H. Green; contractor, Ernest Nag 1; signed, Aug. 21; filed, Sept. 8; cost \$1500.
- Glover near Leavenworth. To build; owner, Jas. Kaungisser; architect, E. J. Vogel; contractor, J. Savage; signed, Aug. 13; filed, Aug. 14; cost \$275.
- Green near Gough. To build; owner, Andrew Glover; architect, W. H. Wharf; contractors, Blanchard & Clark; signed, Aug. 16; filed, Aug. 16; cost \$3555.
- Golden Gate Ave. near Lyon. To build; owner, Fannie Ambrose; architect, M. O'Brien; contractor, D. Ross; signed, Aug. 15; filed, Aug. 18; cost \$1738.
- Green near Gough. Plumbing; owner, Andrew Glover; architect, W. H. Wharf; contractor, G. C. Sweeney; signed, Aug. 22; filed, Aug. 22; cost \$418.
- Hampshire near 23d. Alteration, etc.; owner, C. O. Johnson; contractors, Lawrence & Nelson; signed, Aug. 23; filed, Aug. 24; cost \$1400.
- Hyde near Sacramento. Additions; owner, Chas. R. Gagen; architects, Shea & Shea; contractor, Jas. A. McDonald; signed, Sept. 11; filed, Sept. 12; cost \$1250.
- Jasper near Filbert. To build; owner, Luigi Redout; contractors, Cuneo & Cavaglia; signed, Aug. 14; filed, Aug. 18; cost \$4800.
- Laidley near Grove. To build; owner, Axel L. Soh; contractors, Peterson & Olson; signed, Sept. 5; filed, Sept. 6; cost \$1600.
- Lyon near Hayes. All work except plumbing and painting; owner, August F. Meyer; architects, Martens & Coffey; contractor, J. Bucher; signed, Aug. 11; filed, Aug. 14; cost \$3735.
- Lyon near Washington. To build; owner, Gertrude S. Bowers; architect, A. Pace Brown; contractor, M. J. Gallagher; signed, Aug. 21; filed, Aug. 25; cost \$4463.
- Lily Ave. near Laguna. Alterations and additions; owner, Thos. Conolly; architect, T. J. Welsh; contractor, D. Currie; signed, Aug. 28; filed, Aug. 31; cost \$1422.
- Market near 8th. Plumbing; owner, Lizzie W. Moffat; architect, C. R. Wilson; contractor, R. Rice; signed, June 20; filed, Sept. 4; cost \$3887.
- Nebraska street. To build; owner, Akolph Richter; contractor, Cuneo & Cavaglia; signed, Aug. 30; filed, Aug. 31; cost \$2600.
- No location mentioned. Carpenter and plaster work; owner, J. Cavagnari et al; contractor, J. J. Dunn; signed, Aug. 12; filed, Aug. 13; cost \$1400.
- Oak near Laguna. Grading, brick and cement work; owner, Jas. M. Goewey; architects, Shea & Shea; contractor, O. E. Brady; signed, Aug. 11; filed, Aug. 14; cost \$1024.
- Oak near Laguna. Plumbing; owner, James M. Goewey; architects, Shea & Shea; contractor, John Doherty; signed, Aug. 11; filed, Aug. 14; cost \$1280.
- Oak near Laguna. Carpenter work iron and plastering; owner, Jas. M. Goewey; architects, Shea & Shea; contractor, Jas. Mooney; signed, Aug. 11; filed, Aug. 14; cost \$6267.
- O'Farrell near Taylor. Moving and all work except plumbing; owner, Stephen T. Gage; architect, H. A. Schulze; contractor, J. H. McKay; signed, Aug. 3; filed, Aug. 14; cost \$6700.
- O'Farrell near Taylor. Plumbing; owner, Stephen T. Gage; architect, H. A. Schulze; contractors, W. S. Snook & Son; signed, Aug. 3; filed, Aug. 21; cost \$1400.
- O'Farrell and Jones. Plumbing; owner, John Proctor; architect, T. J. Welsh; contractor, J. E. Britt; signed, Sept. 8; filed, Sept. 12; cost \$2000.
- Octavia and Chestnut. Grading; owners, V. S. Tevis, G. H. Roe et al; architect, C. S. Tilton; contractor, J. G. Fair; cost \$6050.
- Post and Montgomery. Painting and frescoing; owner, Masonic Hall Association; architects, Kenitzer & Barth; contractor, M. Harmonth; signed, Aug. 3; filed, Aug. 7; cost \$2945.
- Post near Leavenworth. Tinting and fresco work; owner, S. F. Vercin; architects, Bullfield & Kohlberg; contractors, Busch & Mocker; signed, Sept. 3; filed, Sept. 5; cost \$1500.
- Polk and Bonita. To build; owner, Lewis Walsh; architect, Chas. M. Rousseau; contractor, J. W. Hansbrough; signed, Aug. 18; filed, Aug. 18; cost \$3000.
- Polk and Austin Ave. To build; owner, Mrs. Sarah Fry; contractor, O. E. White; signed, Aug. 15; filed, Aug. 16; cost \$1420.
- Point Lobos Ave. To build; owner, E. Servens; architects, Mathison & Howard; contractor, A. Jackson; signed, Aug. 30; filed, Aug. 31; cost \$1800.
- Pine near Scott. To build; owner, Mrs. F. L. McNorton; contractor, B. R. Van Deusen; signed, Aug. 21; filed, Aug. 21; cost \$2350.
- Pine near Buchanan. To build; owner, Ann R. Meader; architect, Wm. Mosser; contractor, J. T. Hayes; signed, Aug. 28; filed, Aug. 31; cost \$3393.
- Potrero Ave. To build; owner, John A. Rippe; contractor, Thos. F. Mitchell; signed, Sept. 15; filed, Sept. 15; cost \$3900.
- Ringold near 8th. To build; owner, Mary Hughes; architect, J. P. Brady; contractors, Holm & Shebley; signed, Sept. 1; filed, Sept. 1; cost \$2480.
- Sacramento near Baker. To build; owner, Washington Dodge; contractor, Geo. Heuling; signed, Sept. 4; filed, Sept. 5; cost \$2300.
- Sacramento near Gough. To build; owner, F. W. Letz; architect, A. J. Barnett; contractors, Ackerson & Patterson; signed, Aug. 17; filed, Aug. 21; cost \$7050.
- Sacramento and Cherry. A dwelling house; owner, Harry Bevell; contractor, C. W. Duffie; signed, Aug. 21; filed, Aug. 21; cost \$1000.
- Sacramento and Pierce. Painting; owner, Gaston E. Bacca; architect, J. J. Manseau; contractors, Rhodes Bros.; signed, Aug. 10; filed, Aug. 22; cost \$1063.
- Sacramento near Buchanan. Two-story frame and brick; owner, Mrs. Phoebe Lowenth; architect, A. Pace Brown; contractor, M. J. Gallagher; signed, Aug. 22; filed, Aug. 25; cost \$6725.
- Shanahan and 17. To build; owner, Jas. H. Cahill; contractors, Brandt & Bateman; signed, Aug. 2; filed, Aug. 24; cost \$2075.
- Shotwell and 25th. To build; owner, Fannie Carlisle; architect, John T. Kidd; contractors, Ogil & Smith; signed, Aug. 24; filed, Aug. 25; cost \$2246.
- Sharon near 15th. To build; owner, Wm. H. Gersterberg; architect, H. Hess; contractor, Chris Knutte; signed, July 27; filed, Aug. 7; cost \$1870.
- Tenth near Bryant. Hose and stable; owner, Ellen J. Tierney; architect, W. C. Mahoney; contractors, R. Doyle & Son; signed, Aug. 13; filed, Aug. 14; cost \$3125.
- Tenth Ave. near California. To build; owner, James M. F. Baumuller; contractor, Jas. Henney; signed, Sept. 1; filed, Sept. 4; cost \$1150.
- Texas near Yolo. To build; owner, Henry Hasemen; contractors, Stevens & Wood; signed, Aug. 2; filed, Aug. 7; cost \$987.
- Trenton near Washington. Brick building; owner, Yee Sue Kwin; architects, Townsend & Wyneken; contractor, A. McElroy; signed, Aug. 16; filed, Aug. 18; cost \$4140.
- Turk near Taylor. Alterations; owner, James G. Fair; day work; cost \$1200.
- Twenty-ninth near Dolores. To build; owner, H. Hesson; days work; cost \$3000.
- Twenty-seventh near Dolores. To build; owner, August Schrick; contractor, R. Frost; signed, Sept. 2; filed, Sept. 11; cost \$1500.
- Türk and Scott. To build; owner, R. F. Morgan; architects, Shea & Shea; contractor, A. N. Meisanc; signed, Sept. 7; filed, Sept. 12; cost \$1674.
- Utah, Centre and Nebraska. School building; owner, California School of Mechanical Arts; architects, Percy & Hamilton; contractors, Thomas H. Day; signed, Aug. 3; filed, Aug. 9; cost \$32,690.
- Utah, Centre and Nebraska. Plumbing; owner, California School of Mechanical Arts; architects, Percy & Hamilton; contractors, Duffy Bros.; signed, Aug. 6; filed, Aug. 9; cost \$5450.
- Valencia No. 836. To build bake ovens; owner, Geo. A. Rutz; architect, E. Jahn; contractor, C. C. Koelling; signed, Aug. 13; filed, Aug. 14; cost \$1080.
- Van Ness Ave. near Vallejo. Brick Building; owners, Hartland & Herbert E. Law; architect, J. L. Mathison; contractor, Chas. M. Depew; signed, Aug. 4; filed, Aug. 7; cost \$14,750.
- Washington and Davis. foundation work; owner, John Ivancovich; architects, Pissis & Moore; contractors, B. McMahon & Son; signed, Aug. 6; filed, Aug. 16; cost \$7329.45.
- Washington and Davis. Removing old buildings, etc.; owner, John Ivancovich; architects, Pissis & Moore; contractors, Gray Bros.; signed, Aug. 13; filed, Aug. 16; cost \$5688.
- Washington near Broderick. To build; owners, Hannah and Rose Phillips; architect, W. H. Lillie; contractor T. T. Pottinger; signed, Aug. 21; filed, Aug. 21; cost \$4200.
- Washington near Lyon. A church; owner, Rev. Jas. Worcester; architect, A. Pace Brown; contractor, M. J. Gallagher; signed, Aug. 23; filed, Aug. 25; cost \$4432.
- Webster near McAllister. To build; owner, Victor Kuchn; contractor, J. S. Hofmeister; signed, Aug. 30; filed, Aug. 30; cost \$2733.

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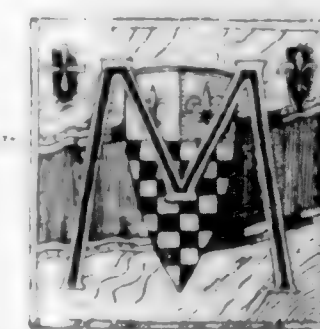
A MONTHLY JOURNAL DEVOTED TO THE ARCHITECTURAL INTERESTS OF THE PACIFIC COAST.

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R. C. E. Grunsky was endorsed for the Candidacy for Superintendent of Streets of the City and County of San Francisco by the San Francisco Chapter of the American Institute of Architects.

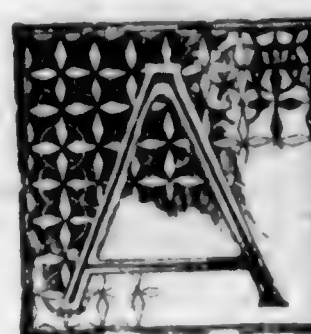
The Chapter wishes it understood that this departure from its usual conservative course, was not occasioned by a desire to enter politics, but from a sincere conviction that the important office of Superintendent of Streets, should be taken out of politics, and given to a man competent to design a system of sewers (instead of suffering them to be built without any system at all) and with enough energy and ability to give the city of San Francisco clean streets, and decent pavements.

We venture to say that for the million and a half dollars yearly raised and expended for these purposes, the citizens of San Francisco have but a small fraction of the benefits to which they are entitled. Street pavements are put down one year to be torn up by the next ring that gets into power, and relaid with another kind of pavement. Sewers are built at haphazard, too small where there is a large area to be drained, and ridiculously large and out of proportion where

but a few blocks are to be drained.

If an architect calculates the drainage of a building, basing his estimates on the depth that the sewers in the street should be laid, and which the data in the public records state the sewer has been laid, ten to one he finds when the sewer has been reached that it is not at the depth it should be, sometimes not within several inches or several feet. Often sewers are discovered having no outlet, and sometimes not connected at all, or connected so low as to trap the flow of sewerage, and form stagnant bodies of putrid liquid and solid matter, that are a serious menace to the public health. The garbage of the city instead of being burned, is dumped into the low lands along the water front, leaving a legacy of disease and death for future generations, when the march of improvements will have built over these districts with factories and tenements.

No wonder the architects think it will be a public benefit to have a capable engineer in charge of this important office. If such a man had directed the expenditure of the thirty millions of dollars that have already been paid out for the streets and sewers of San Francisco, the city would have had something to be proud of to-day, instead of the shameful condition of affairs that has existed so long.



NY Amendments to a Constitution deserve careful consideration before being acted upon. There is one to be passed upon by the people next election which bears looking into. We allude to that one amending Article 13 Section I, which exempts from taxation the property issued for free public libraries and museums. This is a piece of special legislation which it would be an act of great unwisdom to incorporate in our Constitution, for it leaves the door open for all manner of exceptions. If free museums and libraries not belonging to the State are made untaxable then why not any other free exhibition or building—a free dive, a free church or a free lunch, would all put up their claims to have the property used by them exempted. It is against good public policy to allow any property outside of that belonging absolutely to the people, *i. e.* National State and Municipal Property, to be exempted from taxation.

BEQUEST FOR A SCHOOL FOR MANUAL TRAINING.

THE late Mrs. Miranda W. Lux, widow of Charles Lux, a California cattle king, has in her will, given a generous portion of a \$3,000,000 estate to the founding of a school for manual training; the trustees of which school are to receive, invest, reinvest and keep invested the said trust fund and property, and after paying out of the income thereof all necessary or proper expenses connected therewith, to apply the balance of the income to the promotion of schools for manual training, industrial training and for teaching trades to young people of both sexes, in the State of California, and particularly in the city and county of San Francisco, it being the desire to assist in furnishing facilities for the education of young children from the time they leave the kindergarten schools, and while they are still quite young, in what is known as "manual training," and in all kinds of training looking to the acquisition of useful trades by and through which habits of industry will be acquired and practical knowledge of those things which are useful in earning a living may be acquired.

ARCHITECTURE AND POLITICS.

FROM the following dispatches appearing in the daily papers, it can be seen how seriously politics interferes with the proper management of the office of the Supervising Architect of the Treasury Department.

If the Honorable Secretary of the Treasury, would try the recommendations of the American Institute of Architects, (as he is fully authorized to do under the existing laws,) the public would get a chance to see how much better and cheaper the government's work could be done than it is at present.

However, to expect a politician to relinquish his prey, or his patronage is too much to ask of the present school.

WASHINGTON, September 18th.—The retirement of Supervising Architect O'Rourke from the Treasury Department will probably further hinder the work of the department on the plans for the San Francisco public building. Secretary Carlisle, who demanded O'Rourke's resignation late yesterday, did so, he says, for the good of the service. There

will be no difficulty in his way in forcing O'Rourke out of his present position. He will retire voluntarily.

There seems little doubt that there has been a wrangle between the Supervising Architect and the Secretary of the Treasury, his assistants and also chiefs of divisions and clerks in the Supervising Architect's office for several months past, on account of this dissension. The business of the office has been delayed, and what has been accomplished has been done, so it is said, in a very careless way. Just who is to blame is a matter that cannot be satisfactorily explained at the present time. It seems certain that Secretary Carlisle has not followed a politic course with O'Rourke, for the reason that by his course he has simply made O'Rourke a mere figurehead. There has been trouble between them over removals and appointments, and any amount of trouble over the routine business of the office. Had it not been for the turmoil in the architects' department it is believed that the plans for the San Francisco building would have been prepared long before this and the actual work begun upon the site in preparing it for the erection of the immense structure that will yet be put upon it.

Supervising Architect O'Rourke stated to the *Examiner* correspondent to-day that he would retire, having been asked to do so, but that he considered a great injustice had been done him by the Secretary. Before making a thorough investigation of the affairs in this department of the Treasury, O'Rourke would not definitely state just how far the work on the San Francisco public building had proceeded, but intimated that in the change by his retirement and the appointment of a successor there would be a further delay. So far as can be learned at the Treasury to-day it is not probable that the plans for the San Francisco building will be fully completed for several weeks to come.

WASHINGTON Sept. 23d.—Ex-Supervising Architect O'Rourke has given out the correspondence with Secretary Carlisle leading to his enforced resignation. In his first letter O'Rourke alleges the existence of a conspiracy against him, the exposure of which would cause a grave public scandal, and he therefore asks a postponement of his resignation until he can be heard.

In his reply Secretary Carlisle disclaims any specified accusations against O'Rourke's personal or official integrity, but alleged want of system and harmony in the administration of his office. O'Rourke thereupon forwarded his resignation, expressing regret that he was not given the privilege of a personal conference with the Secretary, and adding:

"I have felt for some time that I could not continue to hold the office without surrender of honor and self-respect, because of the many obstructions persistently placed in the way of an orderly and reputable administration of this important office, mainly by two of my subordinates, absolutely without technical or artistic knowledge, who I regret to say, claim to have the special countenance and support of the department. It seems to me that if I had been so unfortunate as not to satisfy these gentlemen in the solution of grave questions of the administration to request my resignation on that account is a unique reversal of the action ordinarily taken when such a state of facts develop in any public office."

ALL Architects wishing to start an Architects Protective Association will please communicate with W. J. Cuthbertson, care CALIFORNIA ARCHITECT AND BUILDING NEWS, 408 California street.

CLEANSING THE STREETS OF PARIS.

BY HENRY SMITH WILLIAMS.



IN spite of the rather poor natural facilities for drainage and for disposal of garbage, Paris is probably the cleanest large city in the world. Even the walls of its buildings, private as well as public, are required by law to be painted or otherwise renovated at regular intervals, while its streets are perpetually swept and scrubbed till their surface is the wonder and admiration of beholders in general and of visitors from the Western hemisphere in particular. Manifestly the average Parisian is largely imbued with love of cleanliness, whatever his short-comings regarding the virtue alleged to rank next above it. But love of cleanliness, even with love of comfort added, will not fully explain the extraordinary attention bestowed upon the exterior of Paris. Love of the beautiful supplies the missing motive. The Parisian regards the parks and boulevards of his beloved city as among its distinctively artistic features. He speaks of the Place de la Concorde, for example, as "one of the most beautiful creations of modern art," and of favorite boulevards as component details of a system "illustrating the clear and solid tendency of French art as developed soon after the Renaissance," and the like. Imagine the average New-Yorker considering his parks and streets in such a light as that! Why, most New-Yorkers seemed but little disturbed when it was suggested, not very long ago, that an elevated railroad should be built along the Western Boulevard, almost the only extensive avenue in the older portion of the city that has considerable artistic possibilities, let alone realities. Under corresponding conditions the average Parisian would faint at such a suggestion. But, after all, utilitarianism must of necessity precede aestheticism. Art is long, and the Western metropolis is young. Doubtless when our municipality is as old as Paris now is (that will be about the year 4000!) we shall be as artistic, as proud of our streets, and as clean—though this last seems from the present standpoint impossible—as Paris is to-day.

In the mean time the method by which Paris is kept clean may advantageously be considered by the residents of New York and other cities that by lack of method are kept filthy. A tangible idea of the magnitude of the problem may perhaps be gained from the statement that the pavements of Paris cover in the aggregate an area equal to that of a field a mile wide and more than five miles long—a field, that is to say, of some 3500 acres. Much the larger portion of this street surface is paved with stone blocks; but as elsewhere, macadamized and asphalt surfaces are substituted on many streets, and of late pavements of wooden blocks have come into vogue, finding favor in particular in the vicinity of school buildings and wherever else noiseless traffic is especially to be desired. The stone pavement is by far the most economical, as it costs on an average but 76 centimes per square metre annually to keep it in repair while the asphalt surface costs 2 francs, the macadamized, 2 francs 17 centimes, and the wood, 2 francs 80 centimes. The aggregate annual cost of keeping all pavements in repair is two million dollars. This has no reference to cleaning the streets but only to putting them in readiness for traffic. It is a most essential preliminary, however, as the streets could not possibly be kept clean if they were not also kept in perfect repair. The refuse demanding the attention of the street-cleaning

department of Paris, as of any other great city, may be divided, speaking generally, into two classes—(1), pavement garbage, caused largely by the traffic of 100,000 horses and about three millions of people, and (2), ash-barrel garbage, by which term may be described such waste products of indoor living as cannot be removed, via., the sewers, but must be carted off through the streets. Unlike New York and most other cities, Paris handles these two kinds of garbage according to different systems. For convenience of description the one may be spoken of as the street-cleaning system, the other as the scavenger system. The duties of the street-cleaning system are to sweep the streets, depositing all suitable matter in the sewers, and collecting that unsuited for such disposal in piles convenient for removal, and to sprinkle, wash, and in general supervise the pavement surface. The duty of the scavenger service is to remove the ash-barrell garbage, together with such bulkier portion of the pavement garbage as cannot properly be swept into the sewers. The sewers themselves, which as everybody knows, are unique in point of size and in many ways wonderful, have only an incidental interest in the present connection, though of course as accessories of the street-cleaning service they are absolutely essential, and their importance in the general sanitation of the city cannot be overestimated.

When it is said that the entire pavement surface of Paris is swept clean every morning, and that to accomplish this only 3200 men are employed at most, and a large proportion of these only for a few hours each day, it hardly needs saying that the work of the street-cleaning service is conducted in a most systematic way. The plan adopted is, however, extremely simple. For purposes of street-cleaning the city has been divided into 150 districts, called "ateliers." Each atelier is presided over by an official known as a "cantonnier," who is held responsible for the proper care of all streets in his territory. Such a force of subordinate employees and such machinery and apparatus are provided as experience has proved necessary. The "cantonniers" and their chief subordinates are salaried officials (at from 100 to 125 francs per month), and give their entire time to the service; the other employees are paid by the hour (strong men receiving 32 to 37 centimes, and "women, children, and weak men from 25 to 30 centimes"), and, as a rule, are employed only during the morning hours.

The main body of the work is done by sweeping-machines, each drawn by a single horse, the work of hand-brooms being only supplementary. The order of procedure is practically the same in all parts of the city and over all kinds of pavements. Summer and winter the work begins at 4 A. M. In advance goes a watering-machine to settle the dust. This is followed in narrow streets by a single machine, and in wider ones by two or even three machines in succession, the foremost one nearest the centre of the street. Such a cavalcade passing up one side of a street and back the other shifts all the surface garbage of that street into the gutters on either side, while a single man following flushes the gutters, and directs all but the bulkier portions of the garbage into the sewer openings, situated at short intervals between the hydrants. Such a cavalcade is equivalent to a small army of hand-sweepers, it being estimated that each machine does the work of twelve men—that is to say, of twelve Parisians, each of whom is supposed to sweep 500 square metres in an hour. Just what the equivalent of a machine would be in terms of the doughty-muscled time-servers employed in New York's farcical street-cleaning service it would be hazardous to guess. Each cohort of watering-carts and sweeping-

machines has, of course, its definite district to cover, and so accurately are these apportioned that all the different cohorts finish at practically the same time. By about 8:30 the entire city has been swept, and the detritus worn from the pavements by thousands of hoofs and wheels the day and night before is being carried harmlessly on through the great sewers to the Seine, instead of hurtling on every chance gust into the face of the wayfarer, as does the dust of less-favored cities.

The regular-morning sweeping accomplished, the work of the permanent employees of the department varies somewhat in different regions and with varying seasons. In some regions the sweeping-machines make a second tour, in the afternoon, supplemented now by a larger corps of hand-sweepers, since the traffic makes their work less uniform and complete than in the early morning hours. Asphalt pavements must be freely sprinkled with sand to prevent horses from slipping, this being especially necessary because an ordinance that aims to protect the pavement from needless wear requires all horses to be smooth shod. But the most important work of all, from a hygienic stand-point at any rate, is the constant sprinkling of all the streets with water during dry weather. Here again there is a delightful contrast to the New York method, according to which the great shower of the sprinkler, far from falling for just and unjust alike, seeks out with most unorthodox discrimination the abodes of thosefortunates alone, who are able to pay for the privilege to private contractors. In Paris street-sprinkling is not an individual enterprise but a public function, and water everywhere seems free as air. The sprinkling is accomplished in part by horse-cars of familiar pattern (of which 370 are utilized in summer), but in part also by hand-carts, and very largely by hose attached directly to hydrants. The last is by far the most economical method, and one-third of the entire street surface is sprinkled in this way.

In addition to the constant sprinkling, the entire road-bed is inundated from the hydrants at regular intervals, varying from one to three days. All gutters are flushed twice every day. Thus the entire street surface of the great city is actually washed clean at regular intervals, as no New-Yorker ever dreamed of seeing his city washed, except at the fitful pleasure of Jupiter Pluvius. This free use of water, by which the germ-laden dust is prevented at all times from permeating the atmosphere, is a hygienic measure of such importance that it deserves to rank as the most admirable feature of a marvellously efficient street-cleaning system.

The entire street-cleaning system just described is conducted directly by the municipality as such, and all persons employed in this service are paid directly from the city treasury. Such is not the case with the scavenger service, by which all bulkier garbage is removed. For this service also the city is districted, but there the parallel ceases, as the person in charge of each district is not in any proper sense an employee of the city, but only a contractor in his service. Contracts for this work are let to the lowest responsible bidder for terms of three years. The garbage becomes the property of the contractor, and within certain restrictions specified in the contract, he is free to remove it in his own way, employing whom he will to do the actual work as freely as if it were a purely individual enterprise. While these two systems are thus radically different in details—one introducing the socialistic and the other the individualistic principle—yet they are not, after all, so wide apart as might at first thought appear, inasmuch as each rests on the sound principle of divided and accurately traceable responsibility. The cantonnier has practically the same power over his

district in all that pertains to street-sweeping, sprinkling and the like, that the contractor has over his in regard to the removal of bulky garbage, and in practice it seems to make little difference that the subordinates of the one are employed by the city, those of the other quite independently of the city authorities. Needless to say, however, it would make a very great difference in a city where a partisan spoils system governed municipal appointments.

That there should be this separation of the scavenger service from the regular street-cleaning service seems an anomaly, but it is one that is easily explained. It grows out of the fact that the bulkier garbage, which is handled exclusively by the scavenger service, has a commercial value. It is hauled to the suburbs of the city, and sold for fertilizing purposes to farmers. Not long ago the contractors who handled this garbage paid the city for the privilege of removing it, as it could be sold at a profit. But of late the growing city has so encroached upon suburban farms that the market for fertilizers near the city is restricted, and hauling to a distance is so expensive as to take away all profit. Hence, though the garbage is still handled and disposed of in all other respects as before, the city is now obliged to pay the contractors instead of receiving pay from them. The entire cost of the city, however, of removing garbage, which aggregates about a million tons yearly, is only about \$400,000.

The official scavenger system in operation is so simple as to require but a few words of explanation. At 6:30 A. M. in summer, and seven in winter, the garbage wagons start on their respective routes. Each wagon patrols on an average a district inhabited by 3500 persons. They are monster vehicles, each drawn by two or three horses hitched tandem, and they contrast strangely with the diminutive carts used for a similar purpose in New York. With each wagon are four men—a driver, an emptier, and two lifters—and a woman follows with a broom to complete the work. So expeditiously is the work effected that by 9:30 each morning the entire mass of garbage not claimed by the sewers is on its way to the suburbs. For the most part it is hauled to its destination in the wagons in which it was collected.

While the official scavenger service of the city is thus simplicity itself, there is a supplementary, unofficial service that is much more complicated, and which deserves especial notice, because it is in all respects the most picturesque element in the entire street-cleaning system. The half-tramp garbage-cleaner who searches ash barrels for scraps of possible value is a familiar figure in every city, but in Paris this individual has developed and systematized his calling till it is fairly entitled to rank as a trade. There are no fewer than 41,000 persons in the city who follow this calling. They are known as "biffins," or "chiffonniers," and they regard their trade as a perfectly legitimate and honorable one. Indeed, there are various ranks or grades even in this humble calling, and, ridiculous as it seems, the tyro must serve an apprenticeship before being regularly admitted to the title of professional cantonnier. During this stage of apprenticeship the novitiate wanders about the streets at night, securing such gleanings as he may, but being chiefly rewarded by the experience gained as to different localities and their possibilities, and as to tricks and methods of the trade. In course of time he gains acquaintance with some professional gleaners, who ultimately introduce him to one of the "cities" where the chiffonniers live by themselves, usually presided over by a proprietor, who furnishes the lodgings and purchases the gleanings. The novitiate, now becomes a professional, is no longer known as a simple

"ramasseur de nuit," or night picker, but has mounted to the rank of "coureur," or habitual runner. He is now equipped in the regular way, with "dorsier" lantern, and "crochet" (hook), and is instructed in the regular methods of the trade, working only at daybreak, when the ash barrels and boxes are sent out upon the sidewalks. In course of time the coureur requires by right of custom a regular territory, his exclusive right to glean in which is respected by his fellow-chiffonniers. He has now reached the highest grade in his profession, and is known as a "placeur," or placeman. So well observed is the unwritten law that gives the placeur an exclusive right in his territory that he may even sell his privilege—sometimes in a favored locality, receiving from ten to forty dollars in return—and the rights of the purchaser will be similarly recognized. This might at first thought appear to be a case of honor among thieves, but such a deflection does the chiffonnier injustice, for as a rule these gleaners are not thieves. On the contrary, they are credited with rather an unusual degree of honesty, and it is said that they frequently restore to their rightful owners such articles of considerable value as accidentally find their way into the garbage-boxes.

The gleanings that are the legitimate spoil of the chiffonnier cover a wide range of articles, the chief of which are old paper (including books and pasteboard), ropes and thread, wadding and cotton, rags of all sorts, metals, remnants of earthen-ware, horse-hair, human hair, horn, fragments of whalebone, cork, India-rubber, bones, grease, old leather and rabbit skins, and bread crusts. It gives one a curious sense of the degree to which diversification of industries is carried in an old civilization to learn that for each of these different classes of refuse articles there are purchasers who are specialists in that line alone, handling nothing else. For example, there are fifty merchants who handle nothing but old rags, and twenty firms, some of them of considerable importance, that purchase only scraps of paper.

It has been estimated that the gleanings of the placeur bring him sometimes as much as fifty cents a day, and that the majority of coureurs realize thirty cents a day, while even the apprentice or night runner may make twenty cents a day. The total sum received annually by the entire army of chiffonniers for the gleanings rescued by them from the garbage-boxes is estimated to exceed \$5,200,000—about three times the sum expended by the city on its entire street cleaning department. The gross weight of the material rescued by the chiffonniers daily, and through their efforts restored to channels of usefulness, is estimated at about 1250 tons. When it is understood that this is all material of which the contractors who own the entire mass of the garbage would make no use what ever—most of it, indeed, being of such a nature as to detract from the value of the garbage for purposes of fertilization—it will be seen that the work of the unofficial gleaners has a more than respectable degree of economic usefulness, and the pride with which the chiffonnier regards his "profession" seems in a measure justified.

While the street cleaning department of Paris, with its various official sub-departments and its unofficial accessories, attains a degree of efficiency under all ordinary conditions approaching perfection, there is at least one contingency that it has not learned to fully cope with. When at long intervals, there comes a heavy fall of snow, the machinery of street-cleaning is for the moment clogged, and the authorities are sorely distressed. A partial solution of the difficulty has been reached in the suggestion that salt be sprinkled on the snow to facilitate thawing, and large quantities of salt are now kept on hand for this purpose. This is a costly expedient, however, and its efficiency when applied on a large scale has not yet been demonstrated. But, after all, snow falls in large quantities so infrequently in Paris that the

question of its removal can hardly be considered a serious, even if it is an unsolved problem. To the outsider it might even seem that a few days of discomfort from this source, at intervals of several years, might rather be regarded as serving the useful purpose of teaching the public to appreciate by contrast the delightful cleanliness of their streets under all other conditions.

To the New-Yorker who contemplates the harmonious systems by which Paris is made clean each morning before the breakfast time of the average Parisian, there must come by antithesis a painful vision of the methods followed and results achieved by the street-cleaning department of his own city. The results are patent: Paris is clean; New York is not clean. As to details of method, it would perhaps be unfair to press the comparison too far, the conditions of the tasks set the street-cleaning departments of the two cities are so diverse. Paris has the advantage of mild winters, relatively free from frost and snow; also of an inexhaustible water supply, and a matchless system of sewers. But, on the other hand, New York has unexampled natural facilities for drainage, and for sewage and garbage disposal, in that it lies on a relatively narrow strip of land, with an arm of the sea at either elbow; and it would seem that these incalculable advantages of location ought to far more than outweigh any disadvantageous climatic conditions.

It may be freely conceded, however, that there is one condition imposed upon the street cleaning department of New York that insuperably bars the work of that department from successful competition with that of the Parisian authorities. This is the fact that the road-beds of the average streets in New York, only passable or worse in the first instance, are allowed to go unrepaired till their condition is wretched. To make such streets clean in the sense in which the streets of Paris are clean would be impossible; but they might be, and ought to be, made approximately clean—as they never are.

It would be quite useless, however, to seek an explanation of the difference in efficiency between the street-cleaning departments of Paris and New York in the diversity of conditions, natural or artificial, existing in the two cities. The real explanation is to be found only in the difference of principle underlying the operation of the two departments. These principles are not at all difficult to fathom. They may be correctly deduced from observation of the most humble sweepers in these respective services. The Parisian sweeper moves as if he had some definite task to accomplish. He has energy, facility, efficiency. Plainly he is hired to help clean the streets. The average New York sweeper creeps wearily along the street, usually moving against the wind, as if determined that such dust as he stirs at all shall be instantly rescatattered, and on no account gathered in piles to tax the muscles of the garbage-gather. It requires no unusual insight to discover that he is a time-server who can not have been selected because of his fitness for the work in hand. A slight investigation would show why he was selected. The law requires that he shall be a citizen; custom demands that he shall be a faithful follower of the dominant political party. In a word, he has been selected not because of efficiency as a street-cleaner, but because of usefulness at the polls. To secure and maintain his position he requires not energy but "influence;" if he is to work his way to better positions in the service he must have not push, but "pull."

This, then is the fundamental difference between the Parisian and the New York systems of street-cleaning. The authorities of Paris desire and demand that the street-cleaning department shall give them clean streets; the authorities of New York demand that the street-cleaning department, like every other department of municipal government, shall give them—patronage. While this continues so—that is to say, while Tammany continues to rule the city—we may look towards Paris with envy, but not with hope of emulation, for no amount of money placed in coffers controlled by Tammany will suffice to give our streets that degree of cleanliness which public health and public comfort require, and which, were our better citizens less absorbed in their own immediate personal affairs, and more sensible of their duties as voters, public sentiment would imperatively demand.—*Harper's Weekly.*



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

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

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

COMPETITIVE design of the Washington State Capitol at Olympia, Washington, Laver & Mullany, Architects, San Francisco, Cal.

PLACER County Court House, Auburn, Cal., John M. Curtis, Architect, San Francisco, Cal.

RESIDENCE, Carthage, Ill., Geo. W. Payne & Son, Architects, Carthage, Ill.



To the Editor of the California Architect and Building News.

SIR:—In the course of my perambulations through the City Hall Corridors, I happened into the court room of Justice of the Peace G. W. F. Cook, I there heard a very extraordinary summing up of a case delivered by him which deserves publication.

As I understood the case was where an architect was suing an owner for working drawings, receiving bids, etc., for work which did not go ahead.

There was a direct conflict of testimony between the parties as to orders to make these plans; it is not necessary to go into the merits of the case as that didn't cut any figure presumably in the Court's mind, for he did not mention that he considered that one of the parties' oath was better than the other's, but said that the preponderance of evidence was with the defendant (the owner) because it was the custom of architects to make drawings for owners for nothing on the strength of or in consideration of the chance of them getting the work if it went ahead.

The suit was not for sketches, but for full working drawings and specifications, of the making of which the owner admitted he was fully cognizant at all times—therefore the decision of the Justice could refer to only full working drawings and specifications—so that the summing up amounted to this: that it was a practice among architects to submit full working drawings and specifications to owners and to charge them nothing for them on the contingency of getting the work.

The remarks were quite contrary to the facts as I knew

them, for I had never heard of a high class architect ever doing such a thing, or for that matter even a low class architect.

I had heard of several cases of architects preparing sketches for nothing but never in twenty-five years' experience of architects preparing working drawings and specifications for nothing.

I had the curiosity to see the Judge next morning and ask him whether my ears were not deceiving me in the matter, but he answered me that he was quoted correctly. If this opinion goes abroad without protest by all architects, clients will become to believe that such is the case and expect it, and an honorable profession is degraded into a gambling concern—where architectural gamblers put their brains and abilities against one another and put them down against a bank which takes no chances at all, but simply rakes in all the valuables in sight and delivers no equivalent.

The decision, which is the subject of this letter, is only another straw showing the necessity of the establishment of an Architects' Protective Association, the merchants have their M. P. A. why not the Architects their A. P. A.

I hope Mr. Editor that you will see your way clear to receive the names of all architects willing to combine in such a body to protect themselves from future calumnies and exploitation.

Yours,

STROLLER.

To the Editor of the California Architect and Building News:

There are five essential points in securing the health of houses:

1. Pure air.
2. Pure water.
3. Efficient drainage.
4. Cleanliness.
5. Light.

Without these, no house can be healthy, and it will be unhealthy in proportion as they are deficient.

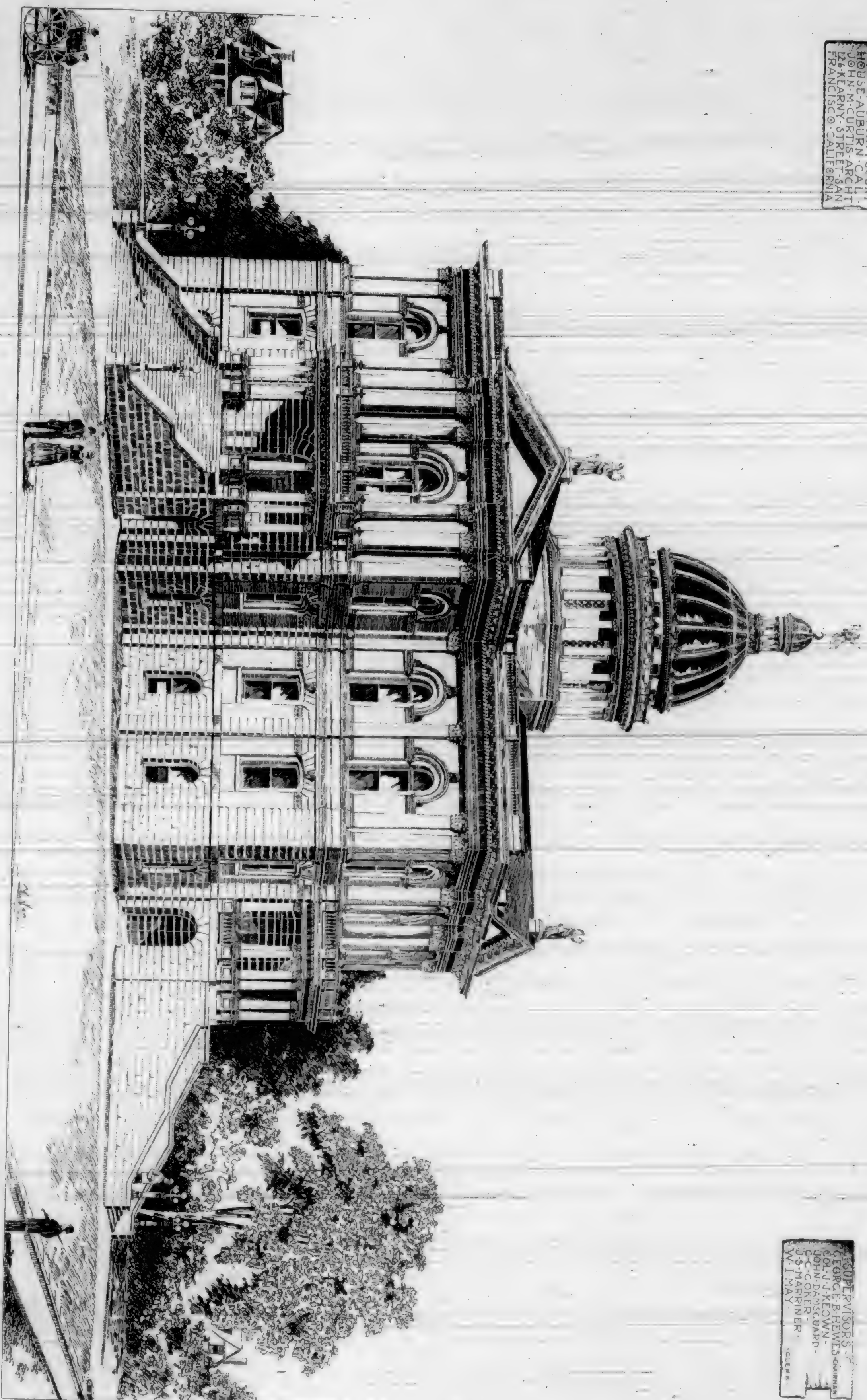
FIRST—To have pure air, your house must be so constructed that the outer atmosphere shall find its way into every corner of it. Architects should consider well, the vital importance of this, and the owner of a house should see to it with his own eyes, no house with any untrapped, unventilated drain pipe (communicating immediately with an unventilated sewer) whether it be from water closet, from sink or from hopper, can ever be healthy; an untrapped sink may at any one time spread fever or Dyæmia among the inmates of a palace.

SECOND—Spring Valley water is not considered always healthy unless it is filtered; well water properly managed is better, but the only healthy water is distilled water.

THIRD—A very great evil in house construction is carrying drains underneath the house; such drains are never safe.

FOURTH—Without cleanliness, within and without your house, ventilation is comparatively useless and there are others ways of having filth inside a house besides foul drains. Old paper walls of years standing, dirty carpets, and uncleaned furniture, are just as ready sources of impurity to the air as if a manure heap were in the basement. People are so unaccustomed from education and habits to consider how to make a home healthy, that they never think of it at all, and take every disease as "from the hand

JAMES C. COFFEY
 HOUSE, AUBURN, CALIF.
 JOHN M. CURTIS, ARCHT.
 SAN FRANCISCO, CALIF.

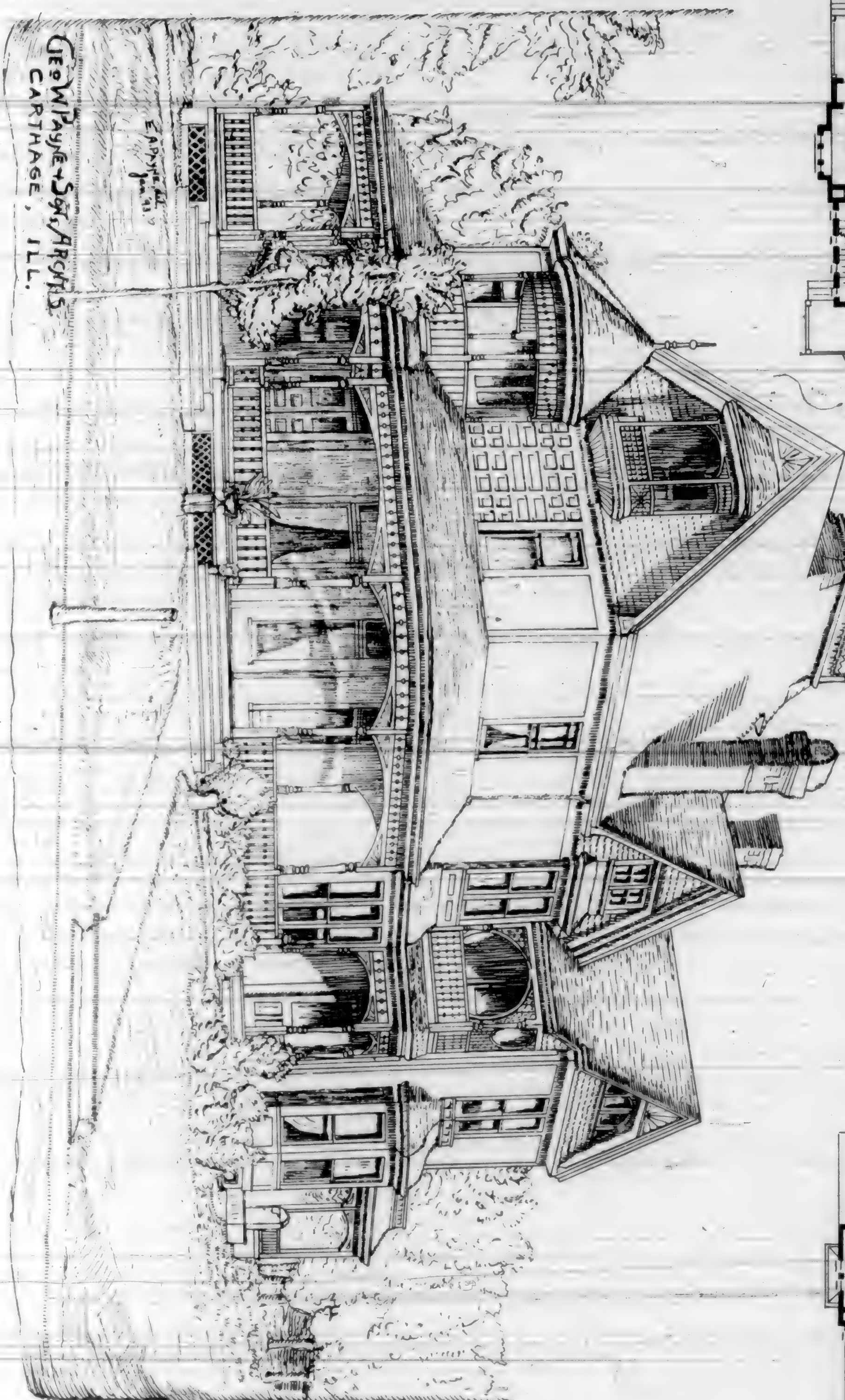
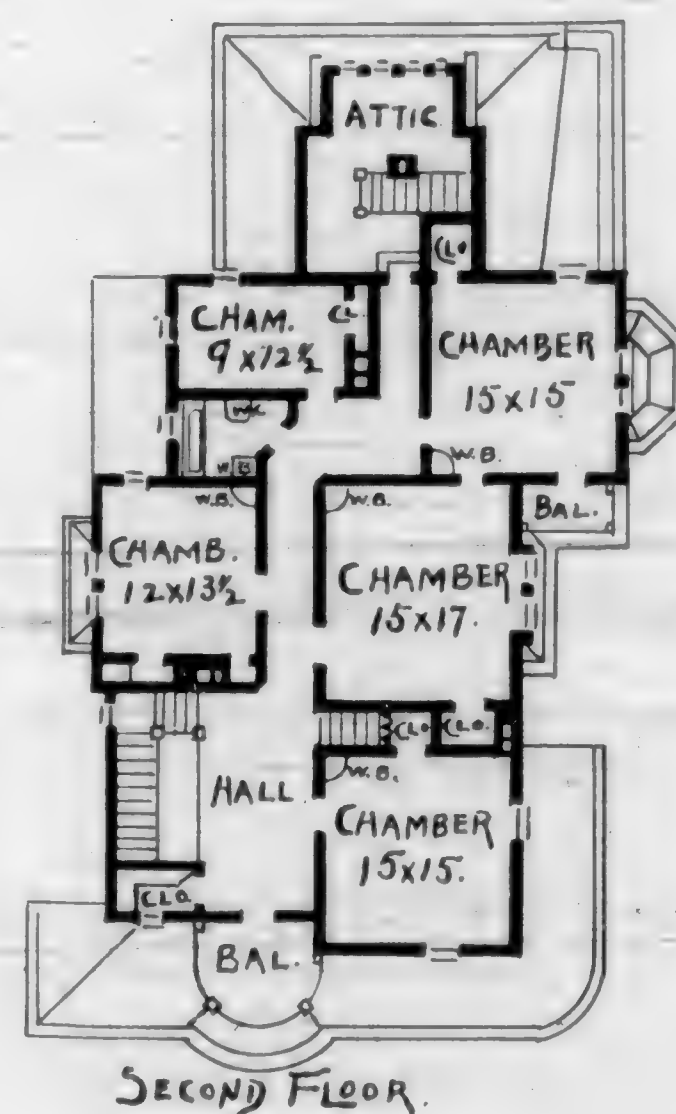
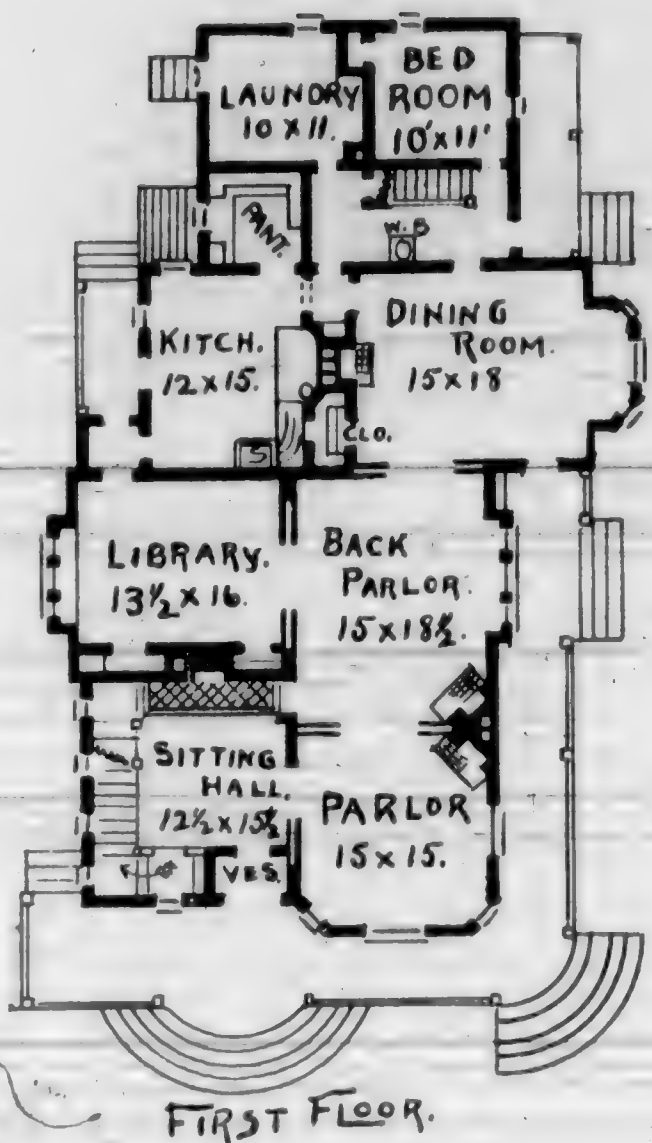


GEORGE E. HEWES
 901 J. K. LANE
 S. C. CONNOR, ARCHT.
 SAN FRANCISCO, CALIF.

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Competitive Design for the
WASHINGTON STATE CAPITOL
 AT OLYMPIA.
LAVER & MULLANY, Archts.
San Francisco, Cal.



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of providence," when in fact it is from their own neglect of a most serious responsibility.

FIFTH—A dark house is always an unhealthy house, always an ill-aired house, always a dirty house; want of light stops growth, and promotes Scrofula, Rickets, etc., among children, and sours the mind and temper of the parents. A great genius once wrote "Where there is sun there is thought," all natural law confirms this, for without sunlight we must degenerate in body and mind.

How stand we in San Francisco in our relation to pure air and sun light?

The architect generally speaking makes ample provision for ventilation and sun light, but as generally speaking, these prime factors of health existence are ignored by the housekeepers. For proof of this, let those interested make inspection any day in any part of San Francisco, say western addition, and view there the noble examples of Classic and Renaissance architecture. The first feeling will be exultant, but soon succeeded by one of sorrow, to see such grand mansions shut up, impervious to air or light, and suggestive of asylums or penal settlements. Can there be here *Mens sana in corpore sano*? With the prime elements of healthy existence shut out "Sound minds in sound bodies" is absent.

In 1844 the writer was connected with a "Health of Towns Commission" appointed by Parliament, Dr. Lyon Playfair, M. P. for Edinboro, was President, he said "The Air of no house with water closets inside can be free from Malaria."

When the average number of people in a house is from five to twenty persons, the amount of fetid Effluvia afloat every day is incalculable. The only remedy, is complete detachment of all water closets and urinals from the house, a detachment not less than six feet. This detachment might be in the form of a square tower connecting with the house by covered bridges at each story.

M.

ENGINEERS OF TO-DAY—AND YESTERDAY.



THE September number of *The Engineering Review*, published in London, England, contains a portrait of Hamilton V. Castner, trained as a chemist under Professor Chandler, at the School of Mines, Columbia College, New York. Mr. Castner has while still a young man proved himself

not only a successful inventor, but has shown a combination of skill, pluck and perservance seldom seen displayed in one person.

The following interesting account of this young chemist is taken from an article headed "Engineers of To-Day and Yesterday" in *The Engineering Review*:

Hitherto, Mr. Castner has been chiefly known to fame as the inventor of the sodium process for the manufacture of aluminium—a process which, although highly ingenious and successful, so far as it went, has since been largely superseded by the electrolytic processes of manufacture inaugurated in the United States and Switzerland, and carried on both there and in different European countries. At the time when Mr. Castner began his experiments on the production of sodium, both that metal and aluminium were exceedingly dear and were regarded rather as curiosities of the chemical laboratory than as products of practical utility in the arts. Mr. Castner was so convinced that there was a wide field open for research and improvement in this direction, that, in 1884, he gave up his business as a public

analyst in New York city, in order that he might devote himself entirely to experimental researches, designed to cheapen and improve the manufacture of these products. After two years of hard work, he succeeded in perfecting his well-known process for the manufacture of sodium, by means of which the cheap production of aluminium was made possible. Convinced that there was then a better field for his process in Europe, Mr. Castner, in 1886, came to London, an utterly unknown man, without friends, and almost without acquaintances, determined to win his spurs in this recondite branch of metallurgy. As a preliminary, he took premises near the Waterloo Railway terminus, where he constructed a small experimental plant, which was to be the pathway to the success at which he aspired. He then obtained introductions to Sir Henry Roscoe, F. R. S., Dr. Anderson, F. R. S., Major-General Sir Andrew Clark, Gerald W. Balfour, and other men of influence and technical ability, who became interested in his process, and were convinced that, as it involved the production of aluminium at very much less than it had previously cost, and sodium at almost as many pence as it had previously cost shillings, it was one of great immediate value and of high promise for the future. As the most likely means of bringing the process into immediate practical operation, a company was formed, of which these and other gentlemen became directors, and works were built by Mr. Castner, at Oldbury, near Birmingham, for working it on a large scale. These works realized to the fullest extent every anticipation that had been formed and every expectation that had been raised by Mr. Castner and his friends—excepting only one. They produced aluminium of a higher purity than had ever before been known on a regular commercial scale selling it at 15s. per lb., which was gradually reduced to 5s., where it had never before been sold for less than 60s., and they produced sodium at 1s. per pound, where it had previously cost 4s. or 5s. or more; but there was no guarantee that the Castner process could "hold the field" permanently as the only one suited to the production of cheap aluminium. At that time chemists and metallurgists all over the world appeared to be working with might and main at aluminium processes, and quite a crop of different systems was announced and discussed month after month in the chemical and engineering press. In the end, another American chemist succeeded, as did also a Swiss chemist at the same time, in producing aluminium by an electrolytic process for 2s. to 3s. per lb., and works were immediately constructed at Pittsburgh and in Switzerland. The American firm, headed by the well-known Pittsburgh engineer, Mr. Alfred E. Hunt, has since, together with the Swiss firm, had a divided monopoly of this industry, at a cost of production that would not have been believed possible when Mr. Castner's friends and himself constructed works to manufacture and sell the metal on a large scale. In other words, it came to this, that while Mr. Castner by his process reduced the cost of aluminium to one-tenth of what it had been when the old Deville process only was employed, the electrolysis process succeeded in reducing the cost of the metal to only one-twentieth part of its cost, less than three years before. Needless to say, the Pittsburgh and Swiss companies got the field, and it is only just to add that they have since held it.

As the success of the electrolytic processes meant the failure of the process introduced by the Aluminium Company, the latter was necessarily placed in a very serious and critical position. They had still the sodium process left, but four years ago there was hardly any demand for sodium, and

there did not appear to be much hope in that direction. Nevertheless, Mr. Castner and his friends made up their minds to develop the manufacture and demand for sodium as the only resource open to them. At that time they had constructed works which had cost them over £60,000, and which were adapted to the carrying on of five or six distinct original chemical processes, actually being worked to an extent that involved the daily consumption of seventy tons of coal, 40,000 lbs. of hydrochloric acid, 10,000 lbs. of caustic soda, 20,000 lbs. of lime and limestone, and many other materials required for the production of 500 lbs. of aluminium. All this was stopped, and Mr. Castner, acknowledging his defeat, took the most manly and praiseworthy course open to him, by endeavoring to improve his sodium process, and create an industry in this metal. The result was that he was able before long to announce that his original sodium process had been superseded by an electrolytic method which gave to his Company a monopoly in the manufacture of this product. Although there was no market for sodium at that time, Mr. Castner turned his attention to its application in the cyanide manufacture, and he succeeded before long in realizing his aim—namely, that practically all the cyanide, which is now so important in the recovery of gold, should be made from prussiate of potash by the use of sodium. In other words, Mr. Castner has created a sodium industry on a considerable scale where none had previously existed.

Even this result, however, did not satisfy the aspirations of Mr. Castner and his friends. At the time when he was endeavoring to improve his sodium process, peroxide of sodium was a curiosity, even in the laboratory, and had no commercial value. Mr. Castner conceived the idea of its manufacture on a commercial scale for application as a direct bleaching agent, and for the preparation of hydrogen peroxide. This he accomplished, inventing a process and securing patents for its manufacture from sodium, until now it has become such a formidable competitor to barium peroxide that that chemical has fallen in price to the extent of over 50 per cent. since sodium peroxide became a commercial product.

In the course of his investigations into the electrolytic preparation of sodium, Mr. Castner became convinced of the possibility of producing caustic soda and bleach by a somewhat similar process, and undertook experiments with that end in view. In this direction many others had worked before him, and not a few appear to have attained the threshold of success, but difficulties have invariably arisen mainly in connection with the means employed for preventing the recombination of the products of the electrolysis. Mr. Castner, with his accustomed ingenuity and resource, has solved the problem effectually, and has succeeded in producing caustic soda of exceptional purity at quite 30 per cent less than the price at which it is produced by the Leblanc-Weldon process hitherto adopted. Satisfied with the results disclosed by Mr. Castner, the directors of the Aluminium Company have recently erected a large plant for the manufacture of caustic

soda and chlorine by the Castner process. That plant, completed only last month, has been examined by a number of the leading chemical experts of the day, and the judgment pronounced upon it, and upon the system generally, has been entirely favorable. In short, Mr. Castner has devised a process which appears to be destined to revolutionize the alkali trade, and to supersede the present processes of manufacture. Of the importance of such achievement to Mr. Castner and his company it is unnecessary to speak. To the alkali manufacturers of the Clyde, the Tyne, and the Mersey, it is, however, manifestly a very serious matter. They have invested upwards of six millions of capital in existing plants and works, which would largely be rendered useless by the success of the Castner process, so that they stand face to face with a grave dilemma.



COUNTRY COTTAGE.

BOOKS AND PERIODICALS.

LIPPINCOTT'S Monthly Magazine comes to hand for September with the complete novel "Captain Molly" by Mary A. Denison author of "That Husband of Mine." Among the short stories "The Sale of Uncle Rastus" is one that will be hard to read with a dry eye.

THE GAS AND PETROLEUM YIELDING FORMATIONS of the Central Valley of California by W. L. Watts, M. E., from the State Printing Office at Sacramento, to those interested we will mention that a free copy can be obtained by application to the State Mining Bureau, 24 Fourth street

San Francisco. The article is a correlation, of all the information as yet obtained by Mr. W. L. Watts concerning the gas and oil yielding formations in the central valley of California and the neighboring foothills, also the result of experiments made to determine the full value of the natural gas both at Sacramento and Stockton and in certain localities in the upper portion of the San Joaquin Valley.

The ILLUSTRATED PACIFIC STATES comes to hand with the announcement of a change of publishers, A. T. Dewey having retired from the management. Jennie E. Patrick and Frank J. Francois assume control and promise that not only will the high character of the Illustrated Pacific States be maintained, but improved upon. Office, 2 Market street, San Francisco. Price \$1.00 per year.

LEGAL DECISIONS.

From a large number of Legal Decisions of the higher Court, of the different States of the Union, we select and publish in this column, such as appear applicable to this section of the country.

CANCELLATION BY PAROL AGREEMENT OF CONTRACT UNDER SEAL.—Where after commencement of work on a building, the owner agrees to permit the contractor to retain twenty-five dollars already paid him above his expenses, and to pay for the material furnished, in consideration of the cancellation of the contract, such agreement is not void for want of consideration. A contract under seal must be cancelled by parol agreement. *Blagborne v. Hunger*, Supreme Court of Michigan, 50 N. W. Rep. 657.

WHERE ONE IS LIABLE FOR USE OF PARTY WALL.—Under an agreement that when any part of a party wall shall be used by the party who did not construct it, or by his heirs or assigns, he or they shall pay half the cost to the party who did construct it, one is not liable for such payment because, at the time she party who did not construct the wall, built a house on the adjoining lot, he was mortgagee of the lot. Nor is he liable because he afterwards became owner of the lot through foreclosure; continuation of the building, after its erection, not being a use of the wall within the agreement. *Pfeiffer v. Matthews*, Supreme Judicial Court of Mass., 37 N. E. Rep. 571.

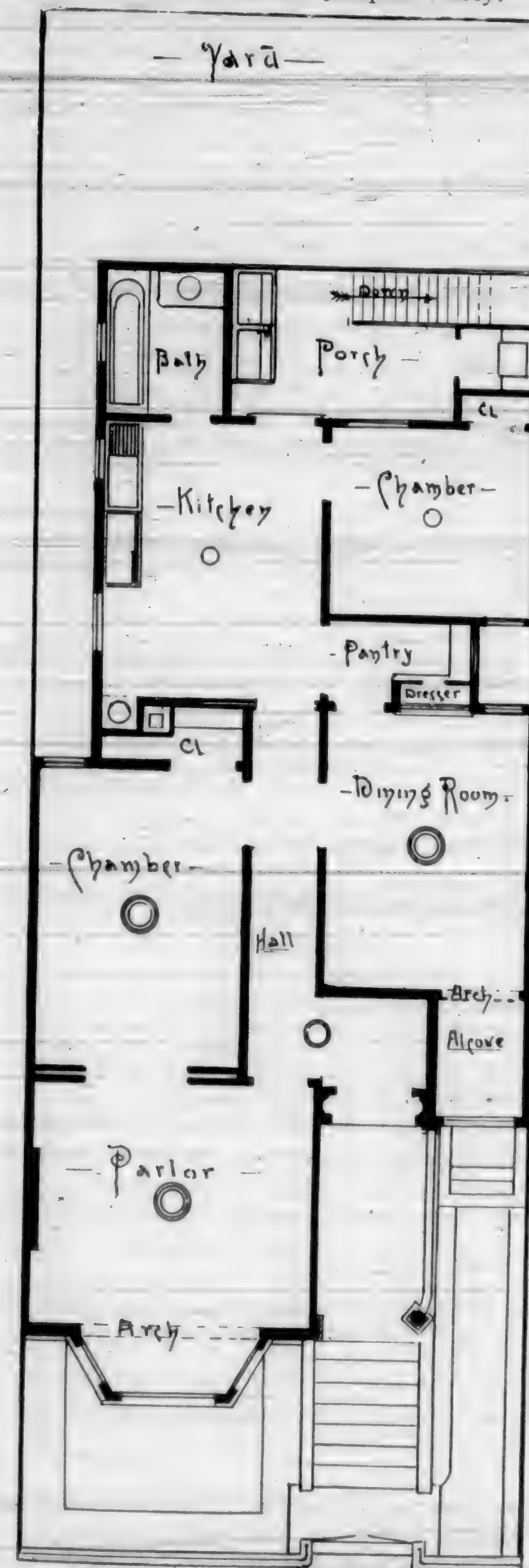
LIABILITY FOR USE OF PARTY WALLS.—The original owner of two lots built houses upon each lot, with a party wall between them, and afterwards sold them to different purchasers without imposing any obligation as to the party wall. A predecessor in title of the present owner of one of the lots built the wall higher after strengthening its foundation. The owner of the other lot having built his house higher, and used the addition to the wall, was not in the absence of an agreement, liable for such use. *Allen v. Evans*, Supreme Judicial Court of Mass., 32 N. E. Rep. 571.

CREATION OF EASEMENT BY RESERVATION OF DEED.—A reservation by the owner of a building comprising two stores in a deed conveying one of them, of "the rights to use the front stairs and hall on the second floor in common with the owners of the premises hereby conveyed," which stairs and hall communicate with both stores creates an easement appurtenant to the premises retained by the grantor, the benefit of which passes to subsequent purchasers of the latter premises. *Waltz v. Waltz*, Supreme Court of Michigan, 59 N. W. Rep. 531.

EFFECT OF UNFULFILLED CONTRACT UPON MATERIAL MEN.—Where the statute provides that every person save the original contractor, claiming a mechanic's lien, must within thirty days after the "completion" of any building file his claim of lien, and that cessation from labor for thirty days on "any unfinished contract," shall be equivalent to a completion thereof. Persons who furnish material to a contractor who abandoned his contract were not entitled to mechanic's liens where their claims were not filed within sixty days after such abandonment, though the owner afterwards made a contract to complete the building, with another, who completed it. *Johnson v. La Grave*, Supreme Court of California, 36 Pac. Rep. 650.

FIXTURES TO REALITY MUST BE PERMANENT.—A derrick used in a stone quarry, capable of removal from one point to another, as required, is not a fixture subject to a lien for material and labor furnished in its construction, though fastened by means of a post set in the ground, and guy ropes attached to the rock by anchor bolts if its removal would not injure the realty. *Honeyman v. Thomas*, Supreme Court of Ore, 36 Pac. Rep. 636.

PAYMENT IN ADVANCE DOES NOT DEFEAT LIEN.—Where the owner of a building pays the contract price to the contractor, before it is due, such payment does not defeat the right to mechanic's liens, though it was made before notices of liens were filed. *Banham v. Roberts*, Supreme Court, General Term, Second Department 23 N. Y. Supp. 828.



ONE HUNDRED YEARS OF BUSINESS LIFE, 1794-1894. A handsome pamphlet with the above title tells the story of the house of W. H. Schieffelin & Co., New York. The illustrations showing a portrait of the founder of this famous business house, as well as the portraits of the present members of the firm, and also various buildings that form an interesting memorial, as well as a land mark in the history of the city of New York.

NOTICE OF MEETINGS.

SAN FRANCISCO CHAPTER, AMERICAN INSTITUTE OF ARCHITECTS, meets second Friday of each month at 408 California street.
 SETH BABSON, Pres. GEO. W. PERCY, Vice-Pres.
 OLIVER EVERETT, Sec. JOHN M. CURTIS, Treas.

TECHNICAL SOCIETY OF THE PACIFIC COAST, meets first Friday of each month at Academy of Sciences Building.
 C. E. GRUNSKY, Pres. GEO. W. DICKIE, Vice-Pres.
 OTTO VON GELDERN, Sec. W. C. RALSTON, Treas.

CALIFORNIA ELECTRICAL SOCIETY, meets the first and third Monday evenings of each month at the Academy of Sciences Building.
 GEO. P. LOW, Pres. C. O. POOLE, Vice-Pres.
 MAX CASPARI, Sec. H. T. BESTOR, Treas.

THE ANNUAL MEETING OF THE SAN FRANCISCO CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE regular monthly meeting of the San Francisco Chapter of the American Institute of Architects was held on October 12, 1894.

There were present Messrs. Babson, Sanders, Henriksen, Bestor, Lyons, Everett, Curtis, Polk and Cuthbertson.

The most important business consisted in the consideration of the report of the Committee having in charge the preparation of a new set of Fire Ordinances for this city, which committee submitted the result of its labors during the past two years. As the hour of adjournment was reached before the discussion was fairly opened, the Chapter decided to have weekly evening sessions on Fridays at 8 P. M., at which

the members of the Chapter are particularly requested to be present.

A member present having made the astonishing statement that a judge on the bench had publicly declared it to be the custom among architects to provide working drawings and specifications to clients for nothing, on the mere chance of being employed, it was resolved to instruct the Secretary to inform his Honor "that it is not now, and never has been the custom among architects, to prepare working drawings and specifications for clients on speculation."

Mr. Marsden Manson was present by request, and gave a great deal of valuable information about the present lack of system in regard to the sewers of this city, and after discussing the evil at some length, the following preamble and resolutions were unanimously adopted:

"WHEREAS, the needs of this city demand that the streets and sewers be placed under competent engineering supervision, and as the California Association of Civil Engineers has put forward one of its prominent members, Mr. C. E. Grunsky, as a candidate for the position of Superintendent of Streets, be it therefore

RESOLVED, that the San Francisco Chapter of the American Institute of Architects, endorse the candidature of Mr. C. E. Grunsky, for the position of Superintendent of Streets, and place itself on record as to the vital importance to the building and business interests, of our streets and sewers being under the supervision of competent professional engineers.

BUSINESS MOSAICS.

It is very necessary that we should have on the Board of Freeholders—the Charter makers, an Architect and Civil Engineer. As questions will arise during the progress of their labors—which can only be considered properly by the aid of an experienced man of those professions. We are therefore glad that one of the Parties has seen fit to nominate for that position our esteemed colleague—W. J. Cuthbertson.

SCHOOL TEACHER—"What have the numerous expeditions to the North Pole accomplished?" SCHOLAR—"Made geography lessons harder."—*Life*.

W. P. Fuller & Co.—This firm from long experience in the paint business can give you facts about paints, and what is more can sell you paint that is in fact all that is claimed. The Phoenix Pure Paint is guaranteed absolutely pure and satisfactory on the building, or they will replace it with any material the architect may select. What more can be asked? If you want the new wall finish or washable water color use Duresco, manufactured by this firm.

Daughter—"I love him he is the light of my life." FATHER—"Well, that is all right, but I object to having my house lit up by him after midnight."—*Pearson's Weekly*.

In all matters connected with sanitary appliances "The J. L. Mott Iron Works" are leaders. The fixtures shown in this edition are especially adapted for Rail Road Depots, School houses, Barracks, Insane Asylums and large buildings, where strength, durability and cleanliness are desired as well as perfection from a sanitary point of view. The well-known reputation of this house is a sure guarantee that the fixtures are all that is claimed for them.

Last May the Illinois Chapter of the American Institute of Architects, instituted the first Chicago building trades and national exhibition which was held in their rooms, at 63, 65, 67 and 69 Washington street, Chicago, May 15th to June 2, 1894.

The Bostwick Steel Lath Co. had an exhibit of their justly celebrated Fire-proof steel lath and on June 30th were awarded a medal and diploma for merit. The same came to hand yesterday. Below we give a copy:

This is to certify that the Illinois Chapter of the American Institute of Architects awarded a Medal for Merit to the Bostwick Steel Lath Co., for its exhibit of steel lath and construction in the First Annual Chicago Building, Trades and National Exhibition held in the Institute of Building Arts, May 15th to June 2, 1894.

MINARD L. BRUSS, Chairman Jury of Awards. H. W. PIERCE, Manager. *The Niles Daily News*.

"That's a good idea, Carry it out," said the editor to the man who came in with a better plan for running the paper.—*Philadelphia Record*.

W. & J. Sloan & Co.—From personal experience we can vouch for the style, price and quality of the goods sold by this firm. If you want carpets that is the place to go to, while for furniture no better place can be found in the city: their upholstery is unrivaled. If you call at 641-647 Market street you will be convinced of the truth of this assertion.

Mother—"And what did you do when he kissed you? I hope you showed him you were angry and indignant." DAUGHTER—"Yes, indeed! I was up in arms at once."—*Puck*.

Schenck's Swinging Hose Reel.—If there should be still any in want of this invaluable article for the protection of mills, factories, hotels and public buildings. Now is the time to make protection against the winter fires almost absolute. Do not forget that the reduction of insurance goes a long way towards paying for this almost indispensable safe guard against the extension of fire—a word of warning before hand is worth a volume of regrets after your building is reduced to ashes for want of this very article that can be found at 593 Mission street near Second, San Francisco.

Man in a hurry—"Is there a way of getting to the Grand Central Depot sooner than by taking this car?" URBAN CONDUCTOR—"Yes, sir; run and catch the next car ahead."—*New York Press*.

Richmuller's Door Opener and Closer is the very thing you want if you are building, because it is the most perfect, simple and durable opener and closer in the market. As there are two wires used, one for opening and one for closing, it will be evident the door is under full control as if you had the door knob in your hand. Orders left with Geo. Richmuller, 320 Nineteenth street, will be promptly attended.

Fogyduff—"I have no money to spend in advertisements." PACER—"Of course you haven't, and that's just the reason."—*Boston Transcript*.

Surely the manufacture of Art Glass is not one of the lost arts, for although the same has been made for several centuries, it has remained for the end of the Nineteenth Century to produce the wonderful effects and delicate shadings in color and tone, that we see in Church windows as well as in private residences, of the present day. The progress made in this particular branch of architectural embellishment has amply kept place with all other arts and sciences, so we thought it not amiss to give a brief description of the process of Manufacturing Art Glass.

It is through the courtesy of Mr. Wm. Schroeder, president of the California Art Glass, Bending and Cutting Works, 103 and 105 Mission street, that we are enabled to do so. The gentlemen mentioned, kindly escorted us through the vast establishment and explained to us all the intricacies of the art. Leaving the elevator (for it is on the third floor) we step into a hall leading to the public and private offices, thence into an elegantly appointed show room, here we were shown samples of art glass, cut, embossed, beveled and all other kinds of ornamental glass work for architectural purposes, variety enough to satisfy the most fastidious in an artistic sense, also all purses could be accommodated, for some beautiful work we saw for a very moderate price.

This article having for its object the description of how art glass is made, we will not linger here but proceed through an immense room where all the machines for glass cutting, beveling, grinding as well as the furnaces for beveling glass, are to the Art Glass Room proper. This room, about 40x50 feet in size contains a great many tables and work benches, at one end of the room we observe the artist designing the patterns actual size on thin detail paper, all the lines represented "lead lines" while the spaces between are for the different colored kinds of glass, the names of which are marked thereon, then the pattern passes to the assistant artist who traces the same on heavy detail paper, this latter being cut with a peculiar kind of shears by following all the lines. Now we have all the small and large patterns in which shape the glass is to be cut, which the art glass cutter, on the table adjoining the artist, cuts by placing each separate pattern on the glass, and running around the same with a diamond. Before cutting the glass the glass cutter submits the same to the artist for inspection to make sure it is the desired color or shade. All the glass pieces are then placed on the first design, which is called the working pattern. Then the lead glazier takes it in hand and puts lead around and between all the pieces, always keeping the outermost in place with round nails, driven into the table. When the leading is done the joints are all soldered so as to make the whole light one solid frame. Having soldered both sides the light is now turned over to the cementing table. The cement is brushed over the glass and lead and thoroughly rubbed in on both sides, after all superfluous cement is cleaned off the light is put aside for it to harden, which eventually becomes as hard as the glass itself and virtually makes the glass and lead one piece. The lead, the cut end of which looks like a capital H, is turned through a mill, also in this room: ten different sizes can be made, for the most delicate tracing to large Church windows. The above description relates to mosaic art glass windows, the same applies to figure windows, only that the parts of a figure, as the face, hands, etc., are painted on the glass, which is already cut to shape by a special artist who has his studio next to the show room, as he requires a north light, for he must paint the glass while looking from a comparatively dark room toward the light, and the latter must be as unchangeable as possible. All the paintings must be fired three and in some cases four times before they are ready for the lead glazier, the reason for this is that the colors vanish to a considerable extent after each firing and they have to be applied again and again until a satisfactory result is obtained. The glass for draperies, foliage, etc., is opalescent or semi-translucent glass and is obtained from factories in Europe and the East which make a specialty of manufacturing the same. Of course it remains for the artist to select the colors and shades to attain the desired result of harmony and design.

In some future article we may give a description of the different processes for the manufacture of Ornamental Glass Cutting as well as beveling, bending, embossing, etc. We cannot close without mentioning the fact that the firm quoted, above received the highest award for Art Glass, the Gold Medal, at the late Midwinter Exposition.

CITY BUILDING NEWS.

Army near Folsom. To build; owner, C. H. Drew; contractor, R. Trost; cost \$2800.

River near Noy. To build; owner, Patrick Parnell; contractor, Chas. Eriksen; signed, Sept. 15; filed, Sept. 17; cost \$3500.

Hotel near 21st. To build; owner, George Resing; contractor, A. Peiry; signed, Oct. 18; filed, Oct. 18; cost \$2715.

Buchanan and Olive Ave. Plumbing; owner, M. Brown; architect, Clinton Day; contractors, Ickelheimer Bros.; signed, Sept. 18; filed, Sept. 18; cost \$1500.

Broadway near Mason. To build; owners, Jean and Maria E. Baron; architect, Emil Depierre; contractor, Jas. McLean; signed, Sept. 14; filed, Sept. 18; cost \$5000.

Broadway near Mason. Plumbing; owners, Jean and Maria Baron; architect, Emil Depierre; contractor, H. Williamson; signed, Sept. 14; filed, Sept. 18; cost \$740.

Broderick near Park Road. One-story frame; owner, Wm. W. Delano; contractor, W. W. Redmill; signed, Sept. 23; filed, Oct. 5; cost \$1800.

Bryant near 18th. Alterations and additions; owner, Mrs. Ellen Mullen; contractors, J. H. Rothgeber & J. M. Mullins; signed, Aug. 31; filed, Sept. 20; cost \$1690.

California near Lyon. To build; owner, P. J. Fitzpatrick; architect, W. H. Wharf; contractor, F. W. Maurice; signed, Oct. 8; filed, Oct. 12; cost \$3300.

Corporate Limits of the City and County of S. F. To build; owner, D. W. Teltjen; architect, J. M. Curtis; contractor, Randolph P. Sanchez; signed, Oct. 8; filed, Oct. 12; cost \$1850.

Church near 20th. To build; owner, P. H. Roddick; architect, R. H. White; contractor, W. Tegeler; signed, Sept. 11; filed, Sept. 13; cost \$2750.

Clement and 3d Ave. To build; owner, D. Dangers; architects, Kenitzer & Barth; contractor, W. J. Field; signed, Sept. 16; filed, Sept. 20; cost \$450.

Clement and 5th Ave. To build; owner, Ernest Uebner; architect, A. J. Burnett; contractor, Ed. Mooney; signed, Sept. 23; filed, Oct. 3; cost \$300.

Day near Dolores. Four five-room cottages; owner, J. M. Comerford also builder; cost \$9000.

Devisadero near Sacramento. Additions; owner, A. W. Scrimmy; architects, Percy & Hamilton; contractor, E. W. Kern; signed, Oct. 2; filed, Oct. 3; cost \$2000.

Eleventh and Minna. Three-story frame and additions; owner, Julia Martin; architect, M. J. Lyons; contractor, Thos. Kinnad; signed, Aug. 25; filed, Sept. 7; cost \$9100.

Eleventh and Minna. Plumbing; owner, Julia Martin; architect, M. J. Lyons; contractor, H. H. Schmidt; signed, Aug. 25; filed, Sept. 17; cost \$1200.

Ellis near Mason. Plumbing, etc., on six-story brick; owner, Maurice Casey; architect, Henry A. Schulze; contractor, Don Leahy; signed, Sept. 8; filed, Sept. 15; cost \$3800.

Ellis near Mason. Artificial stone work; owner, Maurice Casey; architect, Henry A. Schulze; contractor, Geo. Goodman; signed, June 6; filed, Sept. 18; cost \$1033.

Fair Oaks near 26th. To build; owner, Hilda M. G. Roberts; contractors, Dashiell & Land; signed, Sept. 20; filed, Sept. 22; cost \$3000.

Folsom near 10th. Two three-story frames; owner, Chas. Bach; architects, Kenitzer & Barth; contractors, Peterson & Olsen; signed, Oct. 4; filed, Oct. 4; cost \$12000.

Folsom near 10th. Plumbing; owner, Chas. Bach; architect, Kenitzer & Barth; contractor, G. C. Sweeney; signed, Oct. 4; filed, Oct. 4; cost \$1800.

Folsom near 25th. To build; owner, Mrs. J. B. Lieb wife of A. H. Lieb; architects, Martins & Coffey; contractor, J. Bucher; signed, Oct. 9; filed, Oct. 10; cost \$4000.

Fifteenth near Castro. Cottage; owner, Mary O'Brien; architects, Shea & Shea; contractor, M. J. Gallagher; signed, Sept. 12; filed, Sept. 15; cost \$1950.

Fillmore near McAllister. To build; owner, L. C. Levy; architect, J. B. Wuerchling; contractor, J. S. Hafmeister; signed, Oct. 15; filed, Oct. 15; cost \$3000.

Fourth Ave. and California St. To build; owner, John T. McInnis; architect, R. H. White; contractor, Emil Auel; signed, Sept. 17; filed, Sept. 17; cost \$3750.

Fourth Ave. and Clement. To build; owner, Chas. K. Hawthorne; architect, C. F. Robertson; contractor, C. Larson; signed, Sept. 22; filed, Sept. 23; cost \$2000.

Fillmore and Sutter. Plumbing; owner, Mrs. Peter Crichton; contractor, E. J. Duffy; signed, Sept. 24; filed, Sept. 25; cost \$1150.

Golden Gate Ave. and Lyon. Five frame buildings, 12 flats; owner, Roundtree Brothers; day's work; cost \$15000.

Golden Gate Park. Removal of the Royal Pavilion; owner, Executive Com. Mid-Winter Fair; architect, A. Page Brown; contractors, Mahoney Bros.; signed, Oct. 1; filed, Oct. 2; cost \$3500.

Glover near Jones. To build; owner, Hannah Wortsmit; architect, Victor Monet; contractors, Mallan & Harrigan; signed, Sept. 15; filed, Sept. 18; cost \$40200.

Glover near Leavenworth. To build; owner, Mrs. M. Chubak; architects, J. J. & T. J. Newsom; contractors, Jackson & Leavers; signed, Sept. 17; filed, Sept. 18; cost \$2225.

Grove near Webster. Alterations and additions; owner, Herman Fischer; contractor, T. C. Cockrane; signed, Sept. 11; filed, Sept. 18; cost \$1200.

Greenwich No. 527. To build; owner, Louise Stolz; contractor, Jean Baptiste Pene; signed, Sept. 24; filed, Sept. 26; cost \$1562.

Guerrero bet. 15th and 16th. Alterations; owner, F. W. Kreling Sons; architect, W. H. Armitage; day's work; cost \$10000.

Haight near Devisadero. To build; owner, James M. Kane; contractor, James J. Mause; signed, Oct. 2; filed, Oct. 3; cost \$6000.

Harrison near Beale. Owner, Robert S. Moore; architect, C. I. Havens; contractor, J. J. Dunn; signed, Sept. 18; filed, Sept. 24; cost \$100.

Hyde near Pine. To build; owner, Fred. Degar; contractor, J. M. Hoeger; cost \$3000.

Hyde near Pine. Carpenter work; owner, H. W. Hutton; architect, W. H. Little; contractor, Wm. J. Field; signed, Sept. 17; filed, Sept. 20; cost \$4000.

Howard near Leavenworth. To build; owner, Jos. Eigel; architect, R. H. White; contractor, James Campbell; signed, Sept. 17; filed, Sept. 18; cost \$6450.

Howard near 8th. Plumbing; owner, Jos. Eigel; architect, R. H. White; contractor, Geo. Humphreys; signed, Sept. 17; filed, Sept. 22; cost \$1200.

Jackson and Laguna. Excavations and grading; owner, W. F. Whittier; architect, E. R. Swan; contractor, C. A. Warren; signed, Sept. 25; filed, Sept. 28; cost \$700.

Jackson street No. 427. Macaroni factory; owners, L. Valsangiacomo & S. Romani & Co.; contractors, McIntosh & Woolpmann; signed, Sept. 27; filed, Oct. 5; cost \$1425.

Jackson near Broderick. To build; owner, Ida and Luella Gillisbie; architects, Coxhead & Coxhead; contractors, Chas. Paff & Co.; signed, Oct. 12; filed, Oct. 14; cost \$3875.

Jones near Greenwich. Three frame buildings two flats each; owners, R. C. Bolton, Eliza M. Bolton and Frances B. Melliss; architect, Wm. Patton; contractor, Geo. H. Walker; signed, Oct. 2; filed, Oct. 3; cost \$12457.

Jones near Greenwich. Plumbing, etc.; owners, R. C. Bolton, Eliza M. Bolton and F. B. Milliss; architect, Wm. Patton; contractor, John Doherty; cost \$1840.

Landers near 16th. Frame building and stable; owner, Geo. Scherer; contractor, Christ Schweizer; signed, Oct. 8; filed, Oct. 9; cost \$1150.

McAllister near Baker. To build; owner, W. J. Randall; architect, Oliver Everett; contractor, J. B. Kearny; signed, Sept. 24; filed, Sept. 24; cost \$2175.

Mission near 30th. To build; owner, Chas. A. Russler; contractor, E. McHugh McWest; cost \$3000.

Oak near Mason Ave. One-story frame; owner, William M. O'Brien; architect, Smith O'Brien; signed, Oct. 1; filed, Oct. 2; cost \$2250.

O'Farrell near Leavenworth. Plumbing; owner, Emma M. Ricker; architect, W. H. Little; contractor, W. H. Tobin; signed, Sept. 18; filed, Sept. 19; cost \$185.

O'Farrell near Stockton. Plumbing; owners, Gutzeit & Malfanti; architects, Pissis & Moore; contractor, E. James Duffy; signed, Sept. 26; filed, Sept. 27; cost \$10,500.

Page and Scott. To build; owner, F. Koch; architects, Sutfield & Kohlberg; contractor, Chas. B. Schmid; signed, Sept. 11; filed, Sept. 13; cost \$665.

Page and Scott. Plumbing, gas fitting, etc.; owner, F. Koch; architects, Sutfield & Kohlberg; contractors, Shepard Bros.; signed, Sept. 11; filed, Sept. 21; cost \$900.

Page near Webster. To build; owner, Louis Friedlander; architect, J. F. Kenna; contractors, Hood & Watson; signed, Sept. 27; filed, Sept. 27; cost \$3140.

Pacific Ave. near Buchanan. Alterations; owner, Mrs. H. R. Muzzy; architects, Mahoney & Ryland; contractors, Ackerson & Paterson; signed, Sept. 14; filed, Sept. 15; cost \$4300.

Post and Montgomery. Marble work, etc.; owner, Union Trust Co.; architect, Clinton Day; contractors, Fink & Schindler; signed, Sept. 13; filed, Sept. 14; cost \$3988.

Post near Hyde. To build; owner, Lawrence Glennon; architect, V. Veltin; contractor, W. H. Wickersham; signed, Sept. 8; filed, Sept. 13; cost \$3600.

Revel near Greenwich. To build; owner, L. Capurro; architect, Emil Deperre; contractor, S. Soywell; signed, Sept. 21; filed, Sept. 22; cost \$2000.

Prospect Ave. near Virginia. To build; owner, M. D. Coleman; contractor, J. E. Schulz; signed, Sept. 28; filed, Sept. 28; cost \$1225.

Precita Ave. near Bernal Heights. To build; owner, John Rootkeever; day's work; cost \$4000.

Point Lobos Ave. near 6th Ave. Concrete work; owner, French Benevolent Society; architect, E. Deperre; contractor, S. B. Cushing; signed, Oct. 3; filed, Oct. 3; cost \$965.75.

Point Lobos Ave. near 6th Ave. Iron fence, etc.; owner, French Benevolent Society; architect, E. Deperre; contractor, Western Iron Works; signed, Oct. 3; filed, Oct. 3; cost \$3000.

Pine near Lyon. To build; owner, Stephen Edwards; contractor, Thomas F. Crawford; signed, Oct. 3; filed, Oct. 5; cost \$2350.

Scott and Green. Planing mill work; owner, E. A. McCarthy; architect, J. C. Newsom; contractor, A. Hansen; signed, Oct. 13; filed, Oct. 15; cost \$2400.

Scott near Bush. To build; owner, Frank J. Shong; architect, W. H. Wharf; contractors, Schuler & Bauer; signed, Sept. 21; filed, Sept. 24; cost \$2900.

Stewart and Folsom. Repairs; owners, Osmer & Co.; architect, H. Gelfuss; contractors, Lorenza & Fevier; signed, Sept. 25; filed, Sept. 25; cost \$2000.

Stanyan street. Sutra's addition. To build; owner, F. A. Hjett; contractors, Peterson & Person; signed, Oct. 2; filed, Oct. 3; cost \$1630.

Shotwell near 25th. To build; owners, L. A. Hayward & wife; architects, Martine & Coffey; contractor, R. B. Kicks; signed, Oct. 2; filed, Oct. 3; cost \$61500.

Steiner near Felt. To build; owner, James P. McGinty and wife; architect, C. J. I. Devlin; contractors, Ogie & Smith; signed, Oct. 5; filed, Oct. 10; cost \$3753.

Sutter near Lyon. Alterations, etc.; owner, Herman Steffens and wife; contractor, Geo. Lack; signed, Oct. 13; filed, Oct. 15; cost \$3500.

Tehama near 8th. Alterations; owner, Luke O'Connor; architect, M. J. Welsh; contractors, Simanton & Griffin; signed, Sept. 13; filed, Sept. 14; cost \$1185.

Tennessee near Sierra. To build; owner, H. J. and Katie M. Shroder; contractor, T. C. Cochran; cost \$1005.

Townsend near 7th. Alterations and additions; owner, Timothy Hopkins; architect, Henry A. Schulze; contractors, Ingerson & Gore; signed, Sept. 15; filed, Sept. 19; cost \$14,300.

Twenty-fourth near Castro. Cottage; owner, T. A. Born; cost \$2200.

Twenty-fourth and Bryant. To build; owner, Eliza Jane Harkins; architect, M. J. Welsh; contractor, Ira W. Coburn; signed, Oct. 10; filed, Oct. 10; cost \$1200.

Twelfth near H. To build; owner, Mrs. M. R. Kavanagh; architect, W. H. Little; contractor, T. T. Pottinger; signed, Oct. 13; filed, Oct. 13; cost \$2028.

Van Ness Ave. and Clay. Stone, brick and terra-cotta work; owner, Chas. Spreckles; architects, Reid Bros.; contractors, McPhee & Groliere; signed, Aug. 27; filed, Sept. 17; cost \$51,050.

Van Ness Ave. and Geary. Alterations and additions; owner, Mrs. Julia Martin guardian Jeffereys Marten; architect, J. M. Lyons; contractor, H. Jacob; signed, Oct. 2; filed, Oct. 6; cost \$8320.

Van Ness Ave. and Geary. Plumbing, etc.; owner, Mrs. Julia Martin guardian; architect, J. M. Lyons; contractor, H. Williamson; signed, Oct. 2; filed, Oct. 6; cost \$1354.

The California Architect and Building News.

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OFFICE, 408 CALIFORNIA STREET,

SAN FRANCISCO, CAL. U. S. A.

VOLUME XV.

NOVEMBER 20th, 1894.

NUMBER II.

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

Published on or about the 20th of each month by The California Architectural Publishing Company. The Stockholders being Architects and others interested in the profession.

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ESTABLISHED 1879.

INCORPORATED 1889.

NOW IN THE FIFTEENTH YEAR.

W. J. CUTHBERTSON, President.

OLIVER EVERETT, Secretary.

Remittances should be in the form of postal orders, payable to THE CALIFORNIA ARCHITECTURAL PUBLISHING COMPANY, and all communications addressed to the office of the Company, 408 California Street, San Francisco, Cal.

ADVERTISING RATES:

Space	1 Month.	3 Months.	6 Months.	12 Months.
1 Inch.....	\$ 1 50	\$ 4 00	\$ 7 50	\$ 13 00
2 Inch.....	4 00	10 00	18 00	33 00
3 Inch.....	7 50	18 00	32 00	60 00
1 Column.....	12 50	35 00	65 00	125 00
1/2 Page.....	20 00	57 50	105 00	200 00
1 Page.....	40 00	110 00	200 00	350 00



In this part of the country, the increasing use of decorative plaster work for the ornamentation of exterior surfaces, is the cause of our calling attention to the necessity of careful attention being paid by architects and superintendents to the quality of the materials used for this purpose.

Thirty years ago, a great part of the ornamental work on the facades of buildings was done in this material, and its great durability is shown by the excellent preservation of most of the work done at that period of our city's growth.

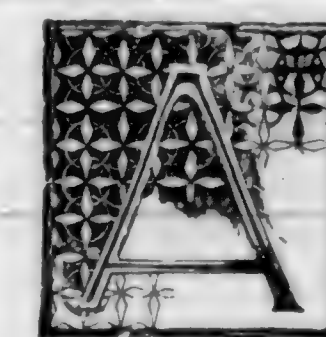
The experience gained at that time, and the improvements since made in the direction of increasing the weathering qualities of this material, allow of its being safely used as a legitimate decorative material, provided it is made and handled by parties capable of appreciating its requirements, and honest enough to fulfill them in its manufacture.

We lately inspected a piece of a frieze that had been in position less than two years, and had already begun to disintegrate, owing to the flimsy construction and poor quality of material used in making it. In fact it was no more capable of giving satisfactory service, than the cheapest quality of

staff used in the temporary structures of our late Midwinter Fair.

Let every architect and superintendent insist on getting good material and workmanship in his decorative plaster work, as the future appearance of his buildings depends largely on this point being insisted on.

Carelessness in this regard will surely cause dissatisfaction sooner or later, and there is no more excuse for excepting inferior material in this case than in passing poor cement when used for concrete work. We will refer to this again in a future issue.



The fifteen Charter makers have been selected and are ready for business, attention ought to be turned to suggestions to the end that the Charter will be likely of carriage by the people.

We have only space in this number to allude, to one clause, that in regard to the division of the city into districts or wards having about equal population, say twelve wards as we have at present. Divide the whole city from San Mateo to North Beach into twelve strips run-

ning from ocean to bay, each strip to be of as near as possible equal in population. At every census (ten years) a redistribution to be made according to the population at that time following the same method. By having this elastic system no gerrymandering can take place and all parts of the city will be equally represented.

CONCRETE CONSTRUCTION, ITS PRACTICAL APPLICATION.

PAPER READ BY ERNEST L. RANSOME OF CHICAGO, LATE OF SAN FRANCISCO, BEFORE THE AMERICAN SOCIETY OF ARCHITECTS, OCTOBER 17, 1894.



Its practical application of concrete may be conveniently divided into four divisions, viz:

- 1st. False work.
- 2d. Materials.
- 3d. Tools.
- 4th. Labor.

The second division can be usefully divided into four sections, viz:

- A. Cement.
- B. Aggregates.
- C. Iron.
- D. Water.

Division A. False Work:

Concrete in respect to False Work is unfortunate in comparison with other masonry because it not only needs more expensive centering whenever centering is necessary; but it also usually requires cribbing, whereas, other masonry does not.

This characteristic entirely prohibits its use in many cases where in all other respects it would be very desirable and it is therefore an obstacle to the more extended use of this valuable construction that should be minimized as much as possible.

Of late years I have met with considerable success by adopting systems of standard centering and cribbing, which whilst not of universal application, are of great use, permitting as they have done of the construction of floors and buildings that otherwise could not have been attained.

Such false work can be used over and over again many times for a long period without material change or repairs, and the parts ultimately requiring renewing are comparatively inexpensive, but as this is of interest to the contractor rather than to the architect, I will not enter into a detailed description thereof.

Great difficulties have often arisen in the swelling of the sheeting of the centering or cribbing, caused by the wood absorbing the moisture of the newly placed concrete. From this cause many arches have been lifted and broken, floors cracked, and walls thrust out of line. By using sheeting boards of a moderate width, say six to eight inches, and bevelling one edge slightly, the boards may be put close together and when expansion occurs, the only effect will be to slightly crush the outer edge of the bevel without lifting or disturbing the concrete abutting or resting upon it; the widest side of such boards being of course placed facing the concrete.

This is such a very inexpensive, simple and unailing remedy, that from its conception I have used it in all cases; and since its use I have never had any trouble from swelling

of the timber. Some such device as this is especially necessary in dry climates, also in light construction, such as floors of but an inch or two in "thickness" or hollow walls.

For standard centering or cribs, if of wood, it is advisable to make them of planed lumber. The surface of the wood should be thoroughly coated with common, thick kerosene oil before it is used for the first time, and before each subsequent use it should be brushed over afresh with the oil. Fresh oil is objectionable, as it is apt to injure the surface of the concrete and linseed oil is generally too gummy for this purpose.

It may be accepted as a general rule that false work of light sheeting, well braced, is more economical than heavier planks with braces farther apart. I am aware that this is not the usual practice.

The ornamental effects can be much more cheaply produced by recessed than by projected work.

MATERIALS—Under this head, cement, by reason of its greater cost and active qualities, stand out pre-eminent. I will limit my remarks under this sub-division to Portland Cement, with the exception of the following observation, viz:

That where rapidity of construction is not a great object and aggregates are unusually cheap, by the use of common lime, with or without some of the cheap native cements, properly handled, work of a good quality and of astonishing cheapness may be made—one part of lime to forty parts of aggregates not being considered too little in some cases.

Portland Cement, a giant from its birth, is striding rapidly along the way of improvement and quality and price, so that formulas of tests that were thought severe a few years ago, would not be considered sufficiently exacting at the present time, to ensure as first class, the cement that would successfully pass them.

The current technical literature teems with methods of testing, so that we can hardly go astray in the selection of a good cement. The three principal requisites for a first class article are as follows:

- 1st. That it sets or hardens without undue expansion or contraction.
- 2d. That it be sufficiently finely ground.
- 3d. That its tensile strength be high.

1st. The cake test. This test is so well known that a description of it here is unnecessary. When time is an object, by the use of hot water, the test may be hastened. Under expert supervision the "boiling test" is by many considered superior to the cake test, but the difficulties in the way of carrying it out, and some uncertainties in the results that yet linger about this new test, prevent me from advocating its substitution for the older test.

2d. The test for fineness. Ninety per cent of the cement should pass through a hundred mesh screen having 10,000 holes to the inch. It would be better to use a yet finer screen for testing but for the difficulty of readily obtaining finer screens. The practice of using coarser screens is to be condemned, because they pass much that is inert. The screenings should feel soft and silky to the touch. The residue on the screen should be hard, black, angular grains. The economic importance of fine grinding has seldom been exaggerated. It is usually unduly disregarded, yet it has been established beyond reasonable doubt, by repeated experiments that the sand-like grains of the cement are practically inert and useless. Still, unlike the first qualification, this is an economic question, and the ill effects of coarse grinding, if not apparent in the first test, can be overcome by making due allowance for the coarse portion in

proportioning the cement to the aggregate, and then but little harm will follow the use of coarse ground cement in ordinary work.

3d. Tensile Strength: This test is usually and best made by aid of the ordinary testing machine. Several first class cements will now develop tensile strengths of 600 or 700 lbs. per square inch in seven days and whilst this may be too high a standard to insist upon, yet the cement that will not furnish a strength of 450 lbs. in seven days, ought not, in my judgment to be graded as first class, unless it is exceptionally fine ground.

It is desirable, when time will permit, to make the tests with a mixture of one of cement to three of sand, but ordinarily with cements of equal fineness, the relative strength of different brands will remain about the same as under the test with neat cement.

With regard to the aggregates, not so much has been published.

Sufficient interest is not usually taken in these inert materials, which, nevertheless, have a powerful influence upon the character of the concrete, so much so, that a good concrete with a poor cement will sometimes give better results than a good cement with a poor aggregate.

A first class aggregate should be made of a hard, tough rock, free from clay or dirt, and having a rough surface and sharp angles when broken, it should be so graded from the finest grains to the largest pieces admissible in the work it is for, as to give whilst retaining the largest proportion of large sized pieces, the smallest proportion of voids.

If the aggregate is all of one material, the desired aggregation can be determined by weighing a given measure. That proportion which, whilst retaining the maximum amount of large pieces weigh the most, is the best.

If on the other hand, the aggregate is composed of different materials, then that proportion which in a given measure and under the same limitations as just given, will permit of the introduction into the filled measure of the least quantity of water, is the best.

In making such tests the larger the measure, the better; a round measure is better than a square box and it should not contain less than two cubic feet. The material also ought to be shaken down into the measure.

For fireproof work, care should also be taken to avoid such aggregates as contain feldspar and where the possibility of the concrete being subjected to a long continued red heat is sufficiently probable as to be worthy of precautions being taken to meet its effects, limestone also should be rejected from the aggregate.

To those who have studied the matter practically, it is evident that in the large majority of cases the prejudice against the use of the dust and finer particles created in crushing brick or stone, is unfounded, and the practice of prohibiting these and substituting therefore, ordinary sand, is strongly to be condemned. Lieut. Innes found that both limestone dust and ground burnt clay gave stronger results than the purest sand, and tests and works carried out under my supervision, thoroughly corroborate this.

The hardest stone does not necessarily make the best aggregate. For instance, finely crushed granite is for some purposes inferior to finely crushed limestone, although as a rule, the granite is the harder of the two. One reason for this is not hard to seek. Owing to the brittle quality of granite, in crushing, it is not only broken into small pieces, but many of these pieces are so bruised or contused that upon a little pressure being exerted upon them, such for in-

stance as can be applied by the finger or thumb, they will crumble. With limestone and many other softer rocks, by reason of their greater toughness and elasticity, this is not the case.

Again, some stones, as quartz and the like, have surfaces of such smoothness that the adhesion of the cement thereto, is not so good as that between cement and other stone such as basaltic lava, sandstones and the like which when fractured, present a rough surface. Such stones as these latter, usually make first class aggregate. Broken stone, as a general thing, is a better aggregate than gravel. Sometimes a mixture of the two is preferable to either alone. Usually the use of one or the other has to be determined by the economic side of the question and the local supply. When from such causes gravel is selected, its quality can be greatly improved, at small cost, by running it through a crusher that will break the larger pieces as they pass.

The common practice of limiting the maximum size pieces so that they will pass through a three inch ring, is I think, open to question. In massive work stones much larger may advantageously be used, not, however, if the late fashionable practice of "dry concrete" be adhered to.

The experiments carried out by Mr. Elliot C. Clarke tend to show that the presence of a small amount of clay in the concrete is no detriment to its strength, even with as much as ten per cent of the aggregates and cement combined.

In corroboration of this I would instance the Niagara gravel, which whilst it contains a marked quantity of clay, yet makes most excellent concrete.

Having determined the aggregate, the next important question is what is the proper proportion of cement to use for any given work?

With first class materials, in round figures and within the limits of proportions between the cement and the aggregates of from one to four, to one to fifteen, the crushing strength of concrete, when skillfully made, at a month old, may be taken as follows: Multiply the constant number 700 by the number representing the proportion of cement used, and divide it by the number representing the amount of aggregate used and it will give the crushing strength in tons per square foot; for instance, a concrete composed of one part of cement to fourteen parts of aggregates should when properly seasoned, have a crushing strength of $700 \times 1 - 14 = 50$ tons; when three months old the strength will have increased some twenty-five per cent and when twelve months old it will have increased some fifty per cent.

Under this rule a concrete composed of one of cement to fourteen of aggregate would be about on a par with good brick work when a month old and be about fifty per cent stronger when twelve months old. This rule reduces the strength of the concrete to much as the proportion of aggregate is increased, but it is reasonably correct, and quite safe to act upon.

SECTION C. IRON.—The tensile strength of concrete is comparatively little, and by reason of the gradual, though slight shrinkage that takes place in all concrete structures that age in dry situations, should not be relied upon in any important work.

For giving tensile strength to concrete, all modern workers of note now use iron in some form or other.

Angular iron bars, cold twisted, commend themselves in many ways, and on this continent they have been more largely used than any other form in concrete-iron construction. The advantages of this cold twisting are many; they may be summed up as follows:

1st. The tensile strength of the iron is largely increased, viz: from twenty to fifty per cent; dependent upon quality of iron used.

2d. Its elongation under strain is considerably lessened, a very important advantage in concrete-iron construction.

3d. It forms a *continuous* key with the concrete, both longitudinally also athwart the bar. The effect of the twist is to *grip* the concrete in every direction, and in fireproof flooring and other work where light construction is desired, the importance of this universal key, is very great, for it counteracts the tendency which a bar otherwise would have to split the concrete along the line of the bar.

4th. The cost of twisting is nominal and the royalty for its use not prohibitory.

In placing these bars, care should be exercised in putting them in the position where they will best exert their strength. They should be strait and laid directly in the line of strain. Any deviation from this rule should be such that the tendency to straighten, which invariably occurs upon the application of the strain, will do little or no damage, such a deviation, for instance as laying a bar of a floor beam with a slight sag in the center. In such a case when the strain takes place, the tendency to straighten would have the effect of thrusting the center of the bar upwards against the downward thrust of the load, and it would be harmless. If on the other hand the bar was laid crowning in the center upon the floor being loaded, the tendency of the bar to straighten would be in the same direction as that of the downward thrust of the floor load and the consequences would be detrimental, if not fatal, to the integrity of the structure.

Concrete is an excellent conservator of iron. Von Emperger states that he knows of a case where iron rods were found perfectly rust free after having been imbedded in concrete below the water level for forty years. (T. A. V. C. E. Vol. 31, P. 447.) W. G. Triest, Jr., states that a wrench that had been buried in concrete twenty-two years had kept its black metallic surface. (T. A. V. C. E. Vol. 31, P. 467.)

Referring to some concrete foundations that I built about ten years ago, the President of Starr & Co. writes as follows under date of December 30, 1893: "Though this foundation is on tide land and submerged in salt water more than half way up, there is no rusting or deterioration to the iron. We had occasion to cut through one of the arches and found the iron as stated." A long time ago I imbedded a dozen pieces of hoop iron in as many blocks of concrete, leaving one end of each piece of iron projecting from the surface. After years of exposure to sea air, all the exposed iron had rusted away, or so nearly as to leave but a few soft, jagged needles of rust that were readily removed by the hand. In all cases upon cutting into the blocks I found the iron almost as good as new and from one to two inches from the surface it was invariably so.

SECTION D. WATER.—The water for mixing should be clear, and by preference soft. If it cannot be obtained of ordinary purity, then due allowance should be made for the impurities by an additional quantity of cement.

Sufficient water should be used to bring the mass when thoroughly mixed into a stiff, sticky, tenacious, visceous condition. An error as to the amount of water that should be used in concrete some years ago crept into the professional practice, both of engineers and architects and with surprising rapidity permeated and revolutionized it. I allude to the erroneous theory that only sufficient water should be

used to slightly moisten the mass, and hardly enough to render it cohesive in its uncompacted state.

An error seldom takes the hold this did upon a skilled body of men without some apparent justification. The only justification that I have been able to find after considerable research is the fact, that in making briquettes for testing purposes, the use of a minimum quantity of water gives the best results. From this one little isolated fact the generalization was made, that to produce the best results concrete should be mixed in like manner. The fatal flaw in this deduction lies here, viz: that a mixture of cement or of cement and sand, with water, differs radically in conditions when to either of these gravel is added, and differs yet more if broken stone is used.

If cement, or cement and sand is mixed with a large proportion of water, it cannot be compacted by blows or such pressure as can usually be brought to bear, for the mixture would flow from under the tamper. In the latter case, however, where gravel or broken stone are used, with a larger proportion of water, the concrete can be compacted more intimately and closely than with the minimum quantity and under all ordinary conditions, makes a much better concrete. The only exception to this is where smooth, rounded pebbles only, are used with the mortar of the concrete, but this exception does not apply to ordinary gravel, and never applies where broken rock is an ingredient. I allude to this at some length, because the error, although on the wane, is still wide spread.

THIRD. TOOLS.—There is great advantage and economy in mill mixing. Mills can now be obtained at a reasonable figure and should always be used on large works. By their use the cement is more fully utilized, the cost of labor lessened and their work is more uniform and satisfactory in character.

An objection is often made to mill-mixed concrete, viz: that the concrete is injured by over mixing. What is "over mixing?" A very rare *disaster* this. I have never once met with it although I have been actively engaged in concrete construction for thirty-five years. It is never epidemic or fatal, but like vaccination, if present, it would prevent worse and more fatal ailments.

Mr. Spencer Newberry found that a mixture of one of cement to three of sand which when worked for one minute with a trowel developed a tensile strength of sixty-seven pounds in seven days; developed a strength of 240 lbs. in the same period after being worked with a trowel for five minutes, a remarkable result, surely and well worthy of consideration.

Contrary to the almost universal opinion, Portland Cement is improved by a delay between mixing and placing. I have experimented with several brands of Portland Cement and find that they were invariably improved in tensile strength by a delay of from one to four hours between mixing and placing.

In placing concrete it is preferable to have it of one uniform consistency throughout the mass. In cases, however, where it is required that the face of the work should be of a finer grade both grades should be carried on simultaneously, the face grade being placed up against the sheeting or mold a little in advance of the backing by means of a trowel or other convenient tool. In more careful work thin strips of iron about six inches wide and of any lengths convenient, may be set up on edge in the concrete parallel to and at any desirable distance from the face of the mold. The face concrete should then be inserted between the mold face and the iron whilst the backing is placed at the other

side thereof. As each layer is put in, the iron is drawn up a few inches, so that when the concrete is tamped, the effect of the tamping is conveyed below the lower edge of the iron, and causes the two grades of concrete to become thoroughly united and monolithic.

The material should in ordinary cases, be placed in thin layers, seldom greatly exceeding in depth the length of the largest aggregates used, and these layers should follow one another sufficiently quickly so that one layer does not become stiff or partially set before the next is upon it.

Flat tampers should not be used for massive work except in the first and last layers of the days work; thin or edged tampers should be employed. Wherever practicable the concrete should be compacted by rolling, in preference to tamping. It is cheaper and much more effective. I am not aware of its being done outside of my own practice, but it is certainly deserving of almost universal use. On large work, steam rollers would be excellent.

It may be accepted as an axiom that concrete cannot be too thoroughly compacted, provided the action is not violent enough to bruise or crush the aggregate.

In massive or deep work, as it proceeds through the day, often the working surface becomes richer in mortar, when, and as often as this occurs, the mixture should be changed by adding thereto more of the larger aggregates free from fine dust, sand or gravel, until this fault is remedied. If on the contrary at any time the surface becomes open for lack of mortar, it should be immediately remedied by putting into the next mixture a lesser quantity of the larger aggregates and not substituting anything in their place.

In a similar way the amount of water used in the mixings should be regulated, changing to more or less as the working surface appears too stiff or too watery. It should be firm under the tamper or roller and yet the mortar should be viscous and unctuous to the touch.

The quantity required to produce the condition varies greatly, dependent upon the character of the aggregates whether but slightly or very porous and upon the age and character of the cement and weather.

Great care should be observed in joining the work of one day to that of the next. The last layer should be thoroughly compacted and left with a slight excess of mortar. It should be finished with a level surface which at proper time, as soon as sufficiently stiff, should be patted or stippled with a steel float so as to produce a surface studded thickly with little conical knobs. This surface should be kept wet throughout the night and in the morning immediately before the application of the first layer of fresh concrete, it should be covered with a wash consisting of a mixture of equal measures of Portland Cement and air slacked lime mixed with water to the consistency of thick cream. This covering should be put on in excess and brushed thoroughly back and forth upon the surface, so as to insure a close contact therewith, the excess being swept along just ahead of the fresh concrete until all the surface has been covered, when it should be removed.

When in place the concrete should be kept moist for as long a period of time as possible. When one bears in mind that the chemical action which causes the cement to harden can only take place in the presence of moisture, the importance of keeping the work wet is at once apparent.

In all concrete construction excepting subway and other works where the concrete remains permanently moist, provision should be made for the slow but certain shrinkage that takes place in the concrete as it becomes thoroughly

dehydrated. The vertical shrinkage will take care of itself as the weight of the building is in harmony with its movement. The horizontal shrinkage, however, is resisted by the inertia of the structure and the friction of its foundation. There are several ways to direct such shrinkage; that which I have found most feasible is to partially divide the wall at certain intervals, preferably over the windows where there are several in line and to insert across the division a weathering strip of copper or lead.

Where the appearance of a straight division line on the face of the building would be objectional, for instance, on a wall blocked off into ashlar face, I build this division straight and caused it to coincide with the line of the V recesses of the ashler, marking in every other course, and I block out in the intermediate courses, recesses opposite to the division line, and subsequently fill these recesses with concrete ashlers made and seasoned beforehand. By adopting the pattern of alternate long and short ashlers in every other course with long ashlers only in the immediate course meeting at the center line of the short ashlers above and below them, there separate concrete ashlers may be made small and the additional cost of their manufacture will be but trifling.

Apart from the questions of appearance some such division of the surface of a concrete wall is advisable for the twofold reason: some defining line is needed at the juncture of each day's work at least, and by dividing up the surface by deep recesses into small sections, surface cracking is largely avoided.

In reference to this shrinkage of concrete, lest I should have unnecessarily alarmed you, I will state that in building, the walls of which were 170 feet long and divided thus it was nearly two years before any apparent shrinkage took place, and now it can hardly be observed by a minute examination of the division joints. No outsider, ever though a careful observer, would be likely to perceive any effects of this slight shrinkage when thus directed.

In situations where it is not possible to make shrinkage joints by a liberal use of twisted iron, shrinkage cracks can often be prevented.

The resistance of Portland Cement concrete to the destroying section of fire.

By a misunderstanding, due to a windy interference (Mr. Stone tells me one of my letters was blown out of his office window) I find I am expected to speak on the protection concrete affords iron in case of fire.

There seems to be not so much data on this subject as one would desire. What little there is, however, seems to be in favor of concrete as a fire resistant.

It is generally understood that the artificial stone made with Portland Cement concrete withstood the Chicago fire well. Some years ago the blacksmith's shop at the Benicia Arsenal, California, was burned out, leaving the outer walls standing. This was a brick building with granite door sills, free stone belt courses, with window caps and cornice of Portland Cement concrete. I examined the ruin carefully. The granite was spoiled badly and broken into several pieces; the freestone was badly broken and injured; the brick work was burnt out in the joints in many places, rendering the walls unsuitable, many of the bricks also being spoiled, whilst the concrete window heads which had probably to bear the brunt of the fire on the outside, were but little injured; the surface had softened a trifle and were badly discolored, but they remained whole and strong.

Concrete bricks made of well burnt clinkers and lime (by

a process which converts the lime into silicate of lime and thereby makes it resemble a Portland Cement in character,) withstanding the action of a hot fire and the subsequent sudden cooling by water better than any burnt brick, either common pressed or fire brick that I could obtain in San Francisco, and I presume the same relative result would be obtained from most of the bricks of the several states.

I have repeatedly made the tests so severe that every burnt brick in the dozen or so tested at a time, broke into two or more pieces, whilst under the same test the concrete bricks, beyond discoloring slightly, showed no change.

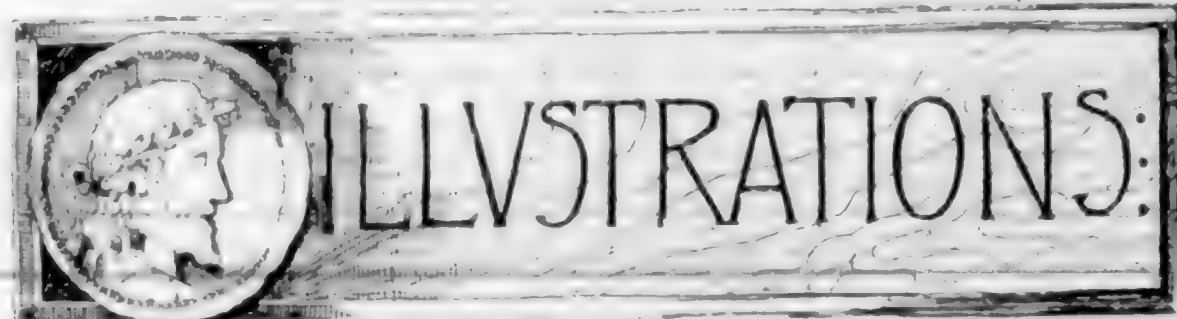
The thermic expansion of Portland Cement; Bonnecan is quoted as giving the expansion of Portland Cement at 0.00000143 for 1 celsius and iron is given at 0.00000145 which is practically the same.

Hyatt corroborates this in some careful experiments he made with loaded floors submitted to fire in which the concrete iron construction bore a red heat for several hours and a subsequent sudden cooling without injury.

Throughout Europe I believe hollow tile construction is almost unknown. Concrete floors are commonly used in fire proof buildings. The result of tests undertaken in Germany under Government supervision to ascertain the relative value of the ordinary building material, including brick work, places concrete at the head of the list as the best fire resistant.

If due regard is paid to the aggregate used, I think it will be found that Portland Cement concrete is an excellent fire resistant.

ERNEST L. RANSOME.



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

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

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

A building for the Native Sons of the Golden West. A. C. Lutgens, Architect, San Francisco, Cal.

ALAMEDA County Crematory, Stone & Cahill, T. P. Ross, Associated Architects.

STERILIZED AIR.

DR. C. F. Buckley's system of aerating water by Sterilized Air—which we illustrated in our February number—has since made rapid progress in the opinions of the medical profession and those interested in health matters and a company has now been incorporated to carry the invention into execution—with such directors as Dr. Luke Robinson, Dr. W. F. McNutt, Dr. Herzstein, Timothy Hopkins, William Greer Harrison and Attorney F. Alleyne Orr.

It is proposed to apply the invention to the water supply of dwellings and public buildings.

The water as taken from the cisterns supplied with this

apparatus when subjected to microscopical tests by bacteriologists was found to be absolutely barren of organic life—a condition which the physicians regard as a scientific triumph. This stands to reason, as all the air supply to the water tanks has first to pass through a sterilizing liquid, such as chloride of iron or formaline—which it of the bacilli which convey disease to many thousands in cities—and passing through the drinking water effectually removes from it the deadly microbes. This liquid will remain good for several months so that the cost of maintenance will be very slight while the benefit to the general health of the community will be incalculable.

THEATER FIRE CATASTROPHES AND THEIR PREVENTION.

BY WM. PAUL GERHARD, C. E.



PREVENTION of fire and incidental panic in halls of audience requires that in the planning, construction, interior arrangement and equipment of such buildings certain rules are followed and certain precautions are observed by the architects and engineers of such structures. Of the greatest importance in respect to the enactment of strict building laws are all buildings where a multitude of people are congregated, by day or at night, for worship, education or amusement, such as churches and synagogues, schools and colleges, concert and lecture halls, circuses and theaters. I shall restrict my remarks to theaters, although much of what I shall say applies equally to the other classes of buildings named.

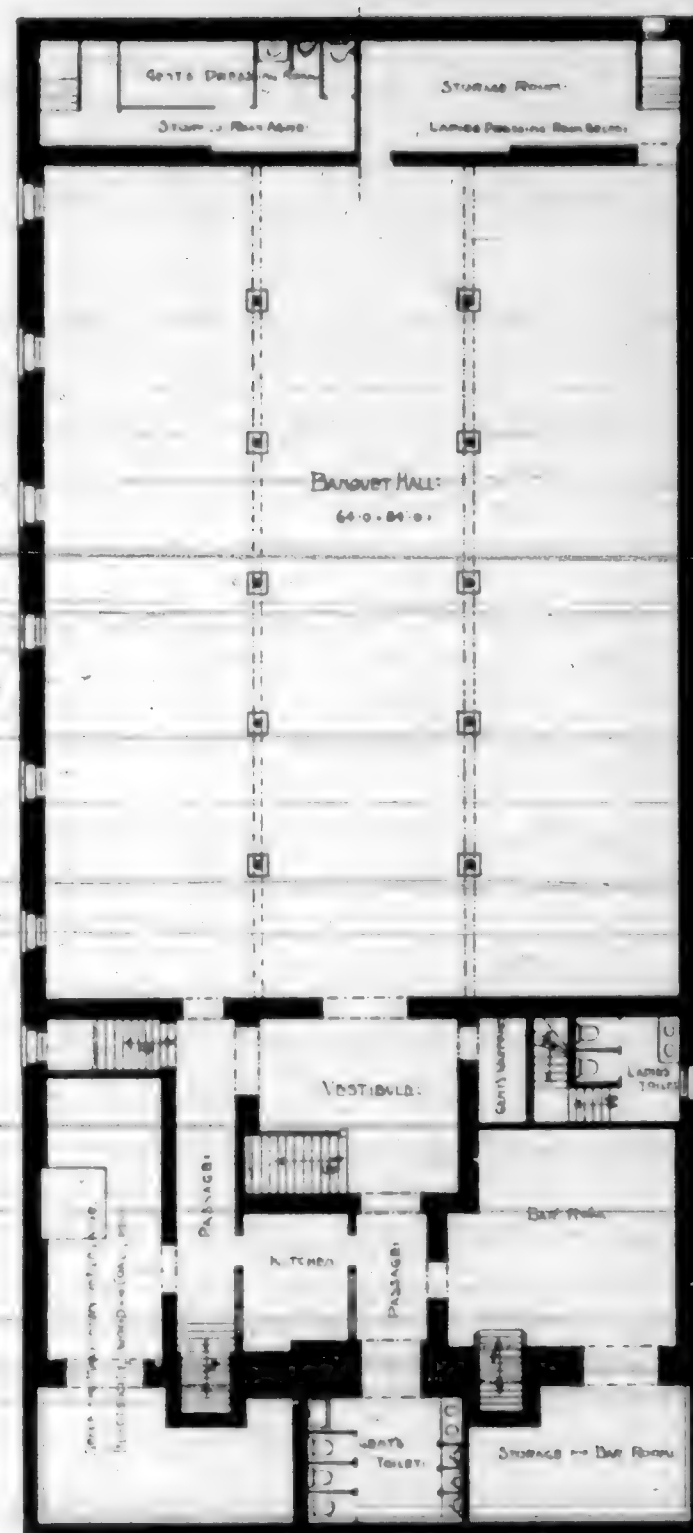
The prevention of theater fire calamities is a subject in which not only firemen but the general public are, or ought to be, much interested.

In the planning and construction of theater buildings, even more than in other buildings, the combined skill, knowledge and talent of both the architect and the engineer are necessary to create a model and safe structure. While the architect works out the best plan on the available site, determines the arrangement of the divisions of the building, decides the mode of construction, designs the elevation, and selects the decorative treatment of the interior, he is assisted by the engineer or by specialists in the various engineering branches in the solution of intricate problems requiring special expert knowledge, such as the construction of difficult foundations, the calculation and the working out of details of all iron constructions, the design of the mechanical or power plant, comprising steam boilers, engines, dynamos, hoisting and general stage machinery, the heating and ventilation of the building, the gas lighting and the electric lighting system, the plumbing, drainage and water supply, the arrangement of the toilet rooms, the general sanitation, and finally the fire protection of the theatre.

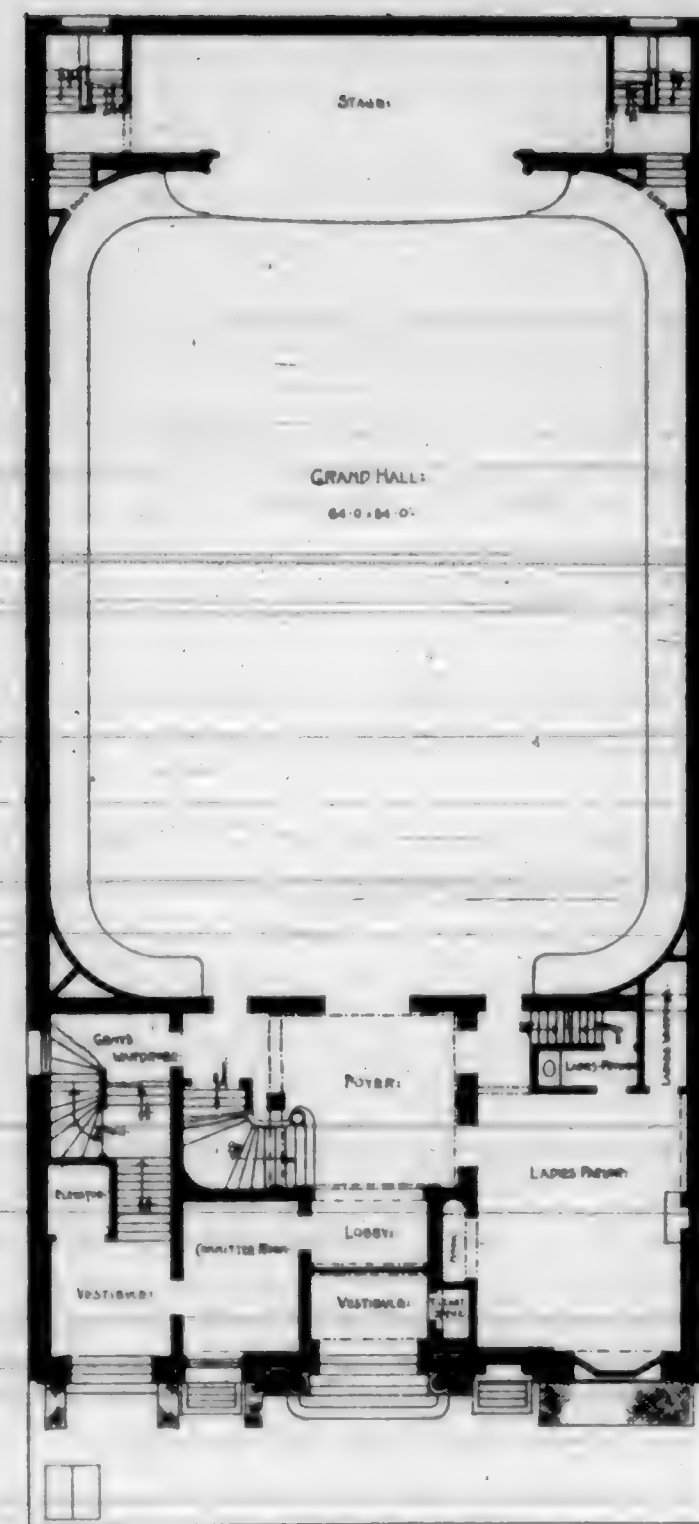
THEATRE FIRE STATISTICS.

To begin with, I shall give a few statistics regarding theater fires and their causes. Here we at once encounter much difficulty in gathering and presenting accurate and reliable figures and facts.

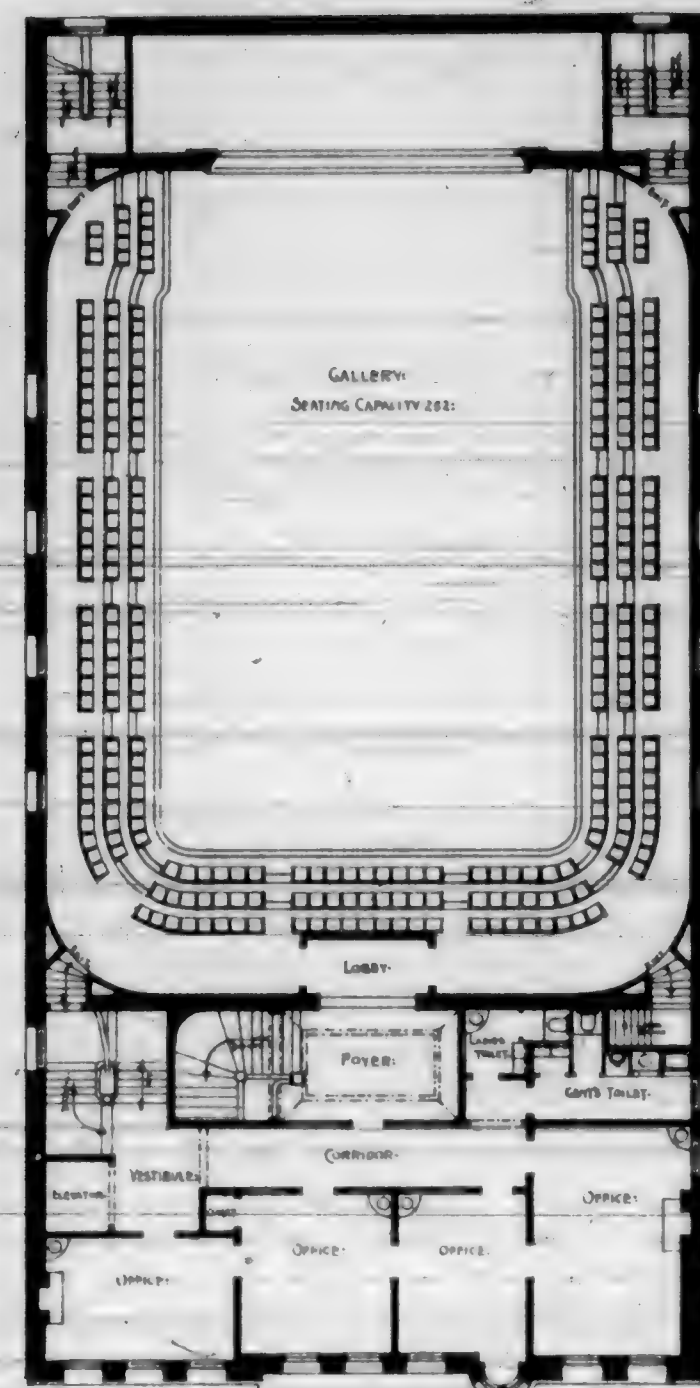
There are numerous cases in which a fire breaking out in a theatre, on the stage, in the auditorium or elsewhere, is at once extinguished by the stage hands or by the firemen on duty in the building. Many cases of this kind never become known to the public or to the press, and no accurate record is kept of them. In other instances, again, blind fire alarms



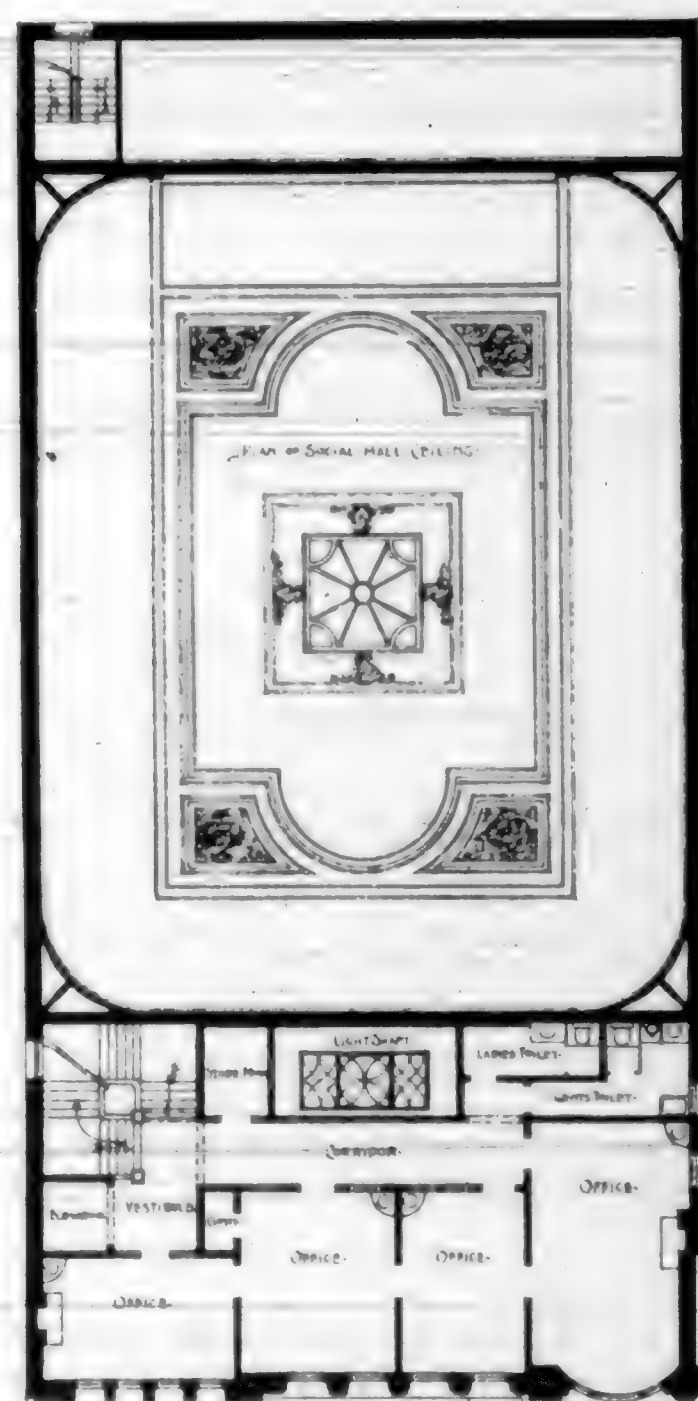
BASMENT



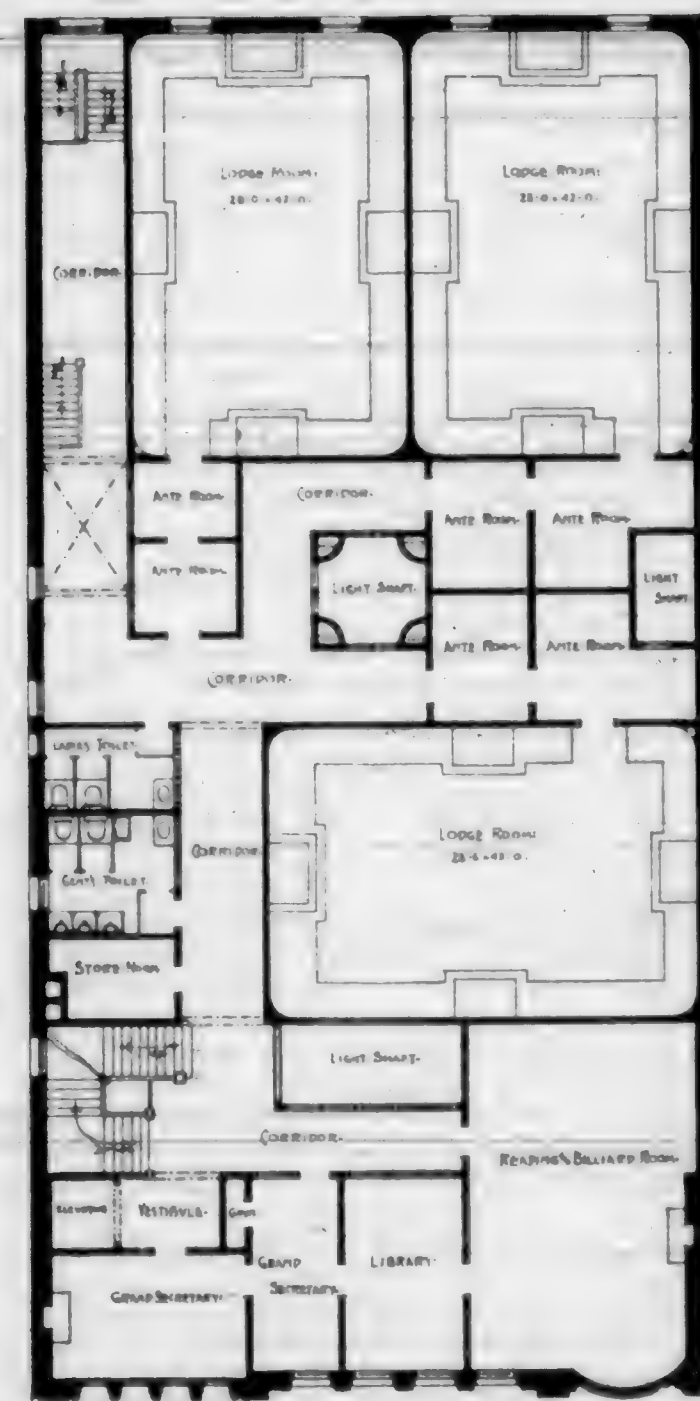
FIRST FLOOR



SECOND FLOOR



THIRD FLOOR

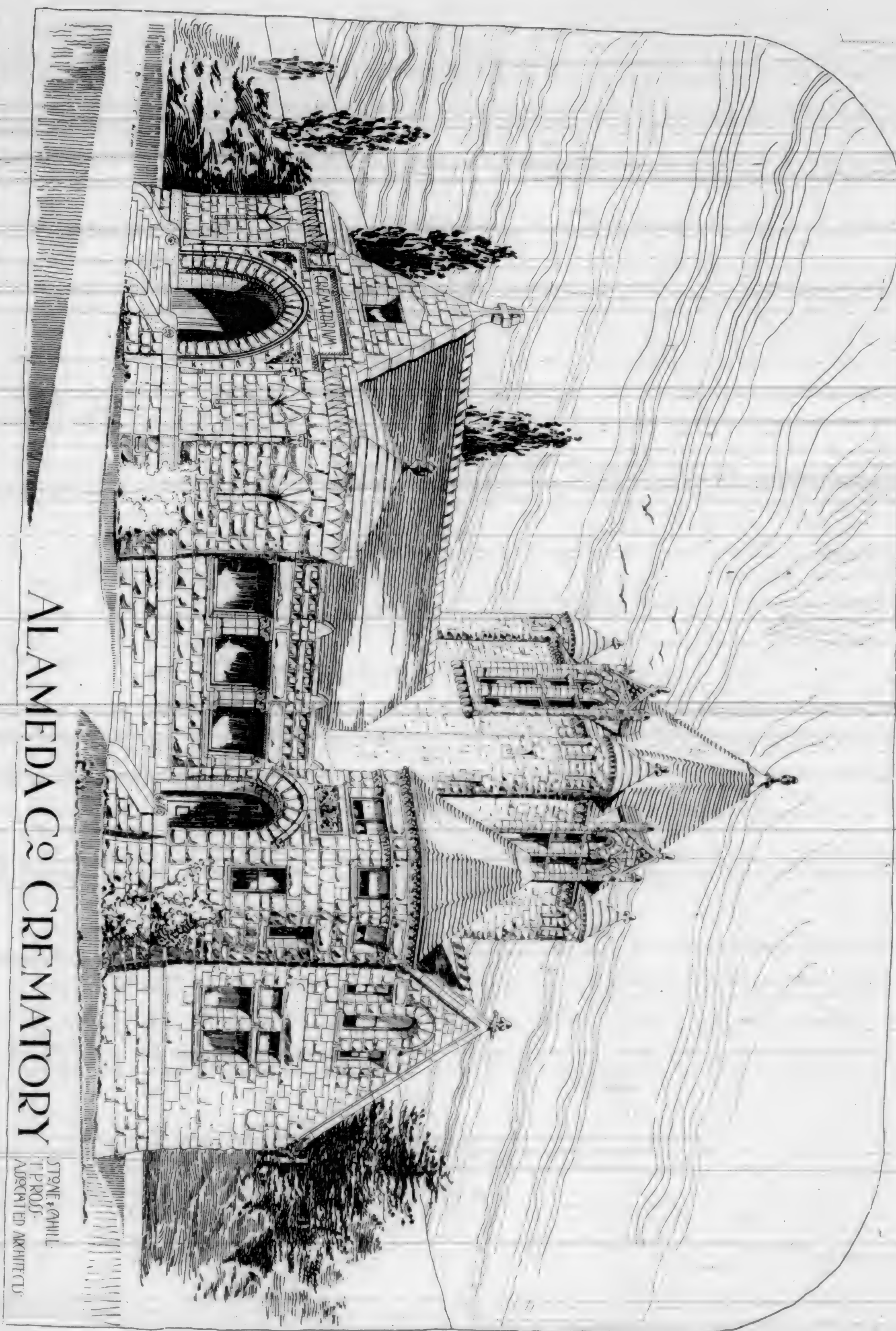


FOURTH FLOOR
N.S.G.W. BUILDING
SAN FRANCISCO CAL.



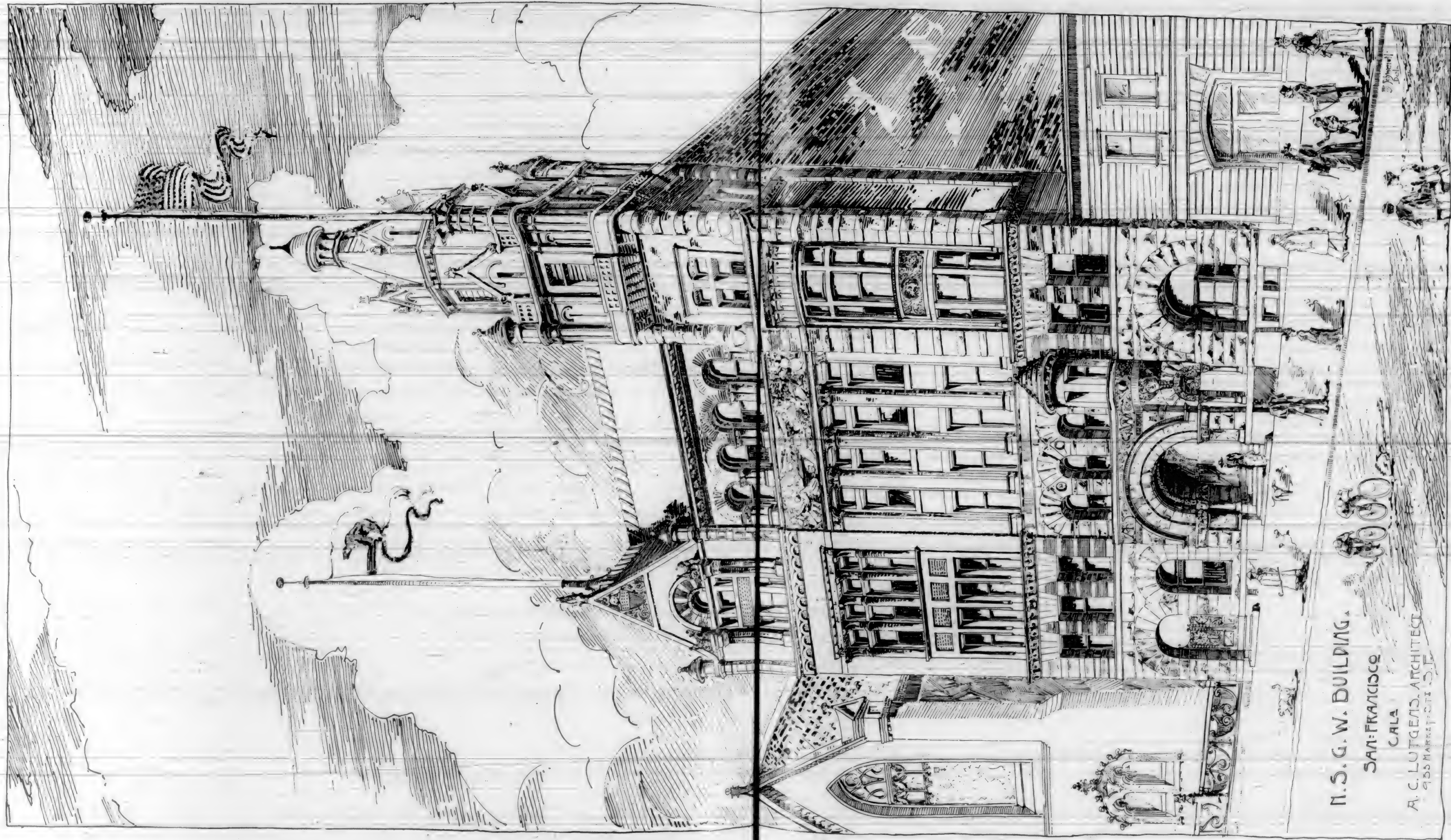
FIFTH FLOOR

A.C. LUTGENS ARCHTCT.
935 MARKET ST.



ALAMEDA CO. CREMATORY

STONE & CHILL
1710 RUSSELL
ARCHTCT. & ARCHTCT.



N.S.G.W. BUILDING.

SAN FRANCISCO

CALA

A.C. LUTGEND. ARCHT.

455 MARKET ST. S.F.

CALIFORNIA ARCHITECT & BUILDING NEWS
SAN FRANCISCO.

BRITTON & KEY PHOTO LITH.

VOL. XV. NO. II. NOVEMBER 1894.

are followed by a panic and often by loss of life. When a fire in a theatre breaks out during the night and destroys the building, the cause of the same often forever afterwards remains a mystery. Distinction must be made between occasional outbreaks of fire which are subdued before they can spread and such fires which completely destroy the building. Those fires which break out during a performance, when the building is crowded with people, are naturally the ones of greatest interest to us. If accompanied, as they unfortunately often are, with loss of life, the number of persons killed and wounded is difficult to ascertain with absolute accuracy, as many perish in the building who are not missed by friends or relatives. The tendency in these cases is usually for the press to exaggerate the number of victims, whereas, on the other hand, the theater officials or the municipality often try to keep the figures below the actual number. The curious mistake is sometimes made of counting both the dead and the wounded in the same figure of victims, obtaining thereby largely increased and incorrect figures.

Out of a total of 252 theatres, 70, or more than one-fourth of them, are destroyed before they reach an age of five years.

Theatres, therefore, as a rule, do not attain an old age, and Herr Foelsch figures the average age of these 252 theatres as 22 3/4 years. For the United States, the average life of a theatre is said to be only from 11 to 13 years, but it should be remarked that these figures were reached some years ago, before the more strict theatre laws of some of our large cities (New York and Boston, and quite recently Brooklyn and Philadelphia) were enacted.

Recent analytical studies of the question have elicited the fact that there are two periods in the life of theatre buildings when they are most endangered or subject to destruction by fire, namely, one from the time of the construction up to and including the first five years; and, the second period, after the theatre has been opened from 40 to 50 years. This may be explained first, by the fact that in a new theatre the safety appliances, the arrangements for lighting, the scene hoisting devices, the fire protection appliances, are rarely in perfect working order, and the theatre employees have not, as yet, become accustomed to handling them, and are likewise unfamiliar with the rules of management.

The second period of renewed danger is explained by the fact that, after the number of years quoted above, much of the apparatus in a theatre has become worn out or useless, and is not always kept in repair or replaced by new apparatus, and it may also be attributed to the fact that after the lapse of many years, the theatre management and inspection are apt to be less strict, and that often interior alterations are made which unfavorably affects the safety of the building.

From the middle of the last century to our present day, nineteen theatres on the average have been destroyed annually by fire.

The hour of the day in which theatre fires started is of considerable interest. Out of 289 fires, 56 theaters burned during the day between the 7 A. M. and the afternoon, or 19.4 per cent; 15 theatres burned one hour before beginning of performance, or 5.2 per cent; 36 theatres burned during performance, or 12.4 per cent; 69 theatres burned within two hours after close of performance, 23.9 per cent; 113 theatres burned during the night and before 7 A. M. next morning, or 39.1 per cent.

Later on, when the records of 373 theatre fires were available, Herr Foelsch found this percentage to remain nearly the same, viz.: 19.9, 5.6, 11.6, 22.6, and 40.3 per cent re-

spectively. It will be seen from these figures that the greatest danger from fire to a theatre is during the two hours following a performance, and not during the performance, as would naturally be supposed. The reason for this is partly that, during the performance, a greater watchfulness exists as regards open lights, the sources of heat, and the other usual causes of fire, and partly because many fires, while actually started during a performance, for instance, by carelessness in the use of fireworks or by the use of fire-arms, do not break out at once, but smoulder for a while in the inflammable scenery and woodwork of the stage, and break out during the hours following the performance. The risk from fire immediately before the performance and while the audience is admitted is found to be three times as great as during other hours of the day, which is explained by the fact that at this time the gas flames are lit which illuminate the scenery.

Theatres are, therefore, safest in the day time, the danger is increased threefold during preparations before the performance, because of lighting up, etc., it is reduced during the performance on account of the careful inspection and greater watchfulness on the stage, but is still twice as large as during the day. The danger reaches a maximum (seven times the day risk) during the two hours after the close of the performance, and it remains during the night nearly three and a half times as great as during the day. (Sparks from fireworks or pistol wads may remain glowing for hours after the performance.)

The theatre fires which break out during the performance are often accompanied with loss of life of both spectators and actors, are therefore of particular, though sad interest to us. The life of firemen is often greatly endangered at theatre fires at all hours, and the list of instances where firemen have been killed while engaged in their duty in trying to save burning theatres is quite large.

Herr Foelsch describes in detail thirty-six theatre fires between 1770 and 1877, which began during the performance, and out of this number not less than six were accompanied by appalling loss of life. From 1877 to 1889 six other deplorable theatre calamities have occurred. In the twelve years from 1876 to 1888, not less than 1600 people have been killed in the six well known theatre disasters of Brooklyn, Nice, Vienna, Paris, Exeter, and Oporto, nearly all of the victims being dead within ten minutes from the time when the flames and the smoke from the stage reached the auditorium and the galleries.

Dr. Choquet, in his statistics, enumerate a total of 732 theatres destroyed by fire from 1751 to 1885, with a total number of victims, i. e., both killed and wounded, of 6573. This list includes fires where firemen lost their lives in the performance of their duty. Since the beginning of this century 536 theatre fires occurred, and from 4500 to 5000 persons had been killed or wounded.

CAUSES OF THEATER FIRES.

Before discussing the precautions necessary for prevention, let us inquire briefly into the chief causes of theatre fires and calamities. This study of the causes leading to fires and panics is of the utmost importance, because it enables us to derive therefrom the best practical lessons as to what to do, and what to avoid, to prevent the occurrence of a disaster.

Dr. Choquet, in discussing the causes of theatre fires, divides them into two principal groups, viz.: (1) The intentional causes, or incendiarism; and (2) the accidental