

and no other, had to pay more than three times as much for it as the contractor who was left at liberty in the matter; and, of course, the extra cost came out of the pocket of the owner of the building. As any architect knows, this is a very common experience, and notwithstanding the impassioned appeals of manufacturers to specify their goods, and their gratuitous supply of specifications mentioning them, the older men in the profession are very reluctant, and with good reason, to call for any appliance or material whatever by name in their specifications. In many cases, knowing the superior quality of a certain article, they would be glad to do so, if it were not for their conviction that they would in that way expose their clients to the risk of being robbed; and they prefer to leave the matter open to competition, even if they have to accept something not quite so good as they would like. That this state of things is not satisfactory either to architects, who wish their clients to have the best things made, or to the manufacturers, who think that their efforts to improve their goods ought to be encouraged, is evident; but the latter have only themselves, or more probably, their selling agents, to thank for the view which architects take of the matter. No doubt injustice is done to some honorable manufacturers by the suspicion and discredit which the tricks of the other sort have aroused in the profession; but this is not the fault of the architects, who have no means of judging, except by analogy, of the conduct of parties not personally known to them, and are columns are always open to the affidavits of dealers who can lay their hands on their hearts and swear that the net price of their goods to contractors is exactly the same where they are called for in the contract as where they are struggling to "introduce" them in competition with other articles of the same sort.—*American Architect*.

THE twenty architects invited to enter the competition for the New York custom house have all signified their acceptance, and the Treasury Department has mailed them the programme upon which the competition will be based. The new custom house will be one of the most important structures ever erected by the government outside of Washington, its cost being variously estimated between three and four million dollars. The architect who will compete for the plans for the new building are: In Chicago—D. H. Burnham & Co., Henry Ives Cobb; in New York, McKim, Mead & White, George B. Post, Bruce Price, Carrere & Hastings, Francis H. Kimball, James B. Baker, Cady, Berg & See, Clinton & Russell, Robert W. Gibson, Isaacs & Harden, Babb, Cook & Willard, H. J. Hardenbergh, Cass Gilbert, Trowbridge & Livingston, George Martin Huss, Howard, Cauldwell & Morgan; in Boston, Peabody & Stearns, Shepley, Rutan & Coolidge. The programme for the building, as sketched out roughly to the proposed competitors, suggests a structure six stories high, with 212,000 feet of floor space the absolute requirement. A hint is thrown out that it may be desired to add two more stories later, and designs may be drawn with reference to this possibility. The material of which the building is to be constructed is not designated, but is left to the discretion of the designers. According to press dispatches, it is the intention of the Secretary of the Treasury to award to the successful competitor the full five per cent commission on the total cost of the building. A commission, composed of the supervising architect of the Treasury and two architects

or experts in the construction of buildings, are to be judges, and report to the Secretary of the Treasury as to the relative merits of the designs and plans submitted.—*The Construction News*.

MILL-CONSTRUCTION is being severely criticised in Chicago, and, if the underwriters have their way, it will soon be a thing of the past. The loss-record for this class of buildings—even sometimes when equipped with automatic sprinklers—has been unsatisfactory, and before the committee of the Board of Underwriters the argument was made that such structures are destroyed even more quickly than buildings of ordinary construction. Rapidly-spreading fires and total losses, it was stated, seem to be characteristic of the class. The Kaestner, Armour, Felt, Traders' warehouse, Jackson Street, and other buildings recently wholly destroyed, are cited to prove their lack of fire-resisting qualities. It is therefore, proposed to suspend all allowances for unequipped mill-constructed buildings, and a sub-committee has been authorized to make the necessary investigations, and report as soon as possible. The underwriters' association has for years made liberal allowances for mill-construction, upon the theory that such buildings were slow-burning, and fires in them could be extinguished with moderate loss. Possibly for this reason, and because so many rates would be upset by withdrawing all existing allowances, it is quite likely that whatever action is taken will apply only to new structures. But the day of mill-construction has probably passed, not to return.—*Exchange*.

A COMMITTEE appointed by the American Institute of Architects reported upon the subject of architectural education at the last annual convention. The first architectural school in the United States was established in 1869, at the Massachusetts Institute of Technology, by Prof. W. R. Ware, who is now Professor of Architecture in Columbia University. Since that time flourishing schools have been established at Cornell, the University of Illinois, Columbia University, Syracuse University, University of Pennsylvania, University of Chicago, Harvard, Tulane, and McGill Universities. Since their establishment no less than 3250 students have received instruction; 650 have graduated, and a large number are now in practice. The committee favored the establishment of an educational requirement for admission to the Institute, and suggested that the diploma of a graduate of a recognized school might be accepted in lieu of an examination.

A MONUMENT to General Lafayette is now in course of construction on the Brandywine battlefield, in Chester County, Pennsylvania, near the spot where the general was wounded. The height of the structure is to be 78 feet, and the size of the base 24 feet square. The material is Brandywine granite, and the largest stone, which is the die, is to weigh fifteen tons. On this stone are to be four bronze panels, inscribed with the full record of General Lafayette, setting forth the battles he was engaged in and designating on what spot he was wounded. The monument is to be crowned with an historic bronze figure of Lafayette 12 feet in height. The memorial is the gift of John G. Taylor, of West Chester, who not only builds the monument but has set aside a sum for the perpetual care of the surrounding grounds.—*Exchange*.

FIRE PROTECTION OF TALL BUILDINGS.

IT WILL be remembered that when the upper eight stories of the Home Life building were out in the recent fire, the chief of the New York Fire Department stated that the failure of the firemen to do any effective work above the ninth story was what he had predicted whenever one of these tall buildings came to be tested by a serious fire. There is a limit of height above which the ordinary methods of fire-fighting by pumping water through a hose are inadequate. Much valuable time is lost in dragging the hose from floor to floor; it is always liable to injury from fire or falling debris; and of course there is the danger of bursting from overpressure, a risk that naturally increases when the water has to be forced to the upper floors of a twenty-story building.

The New York Fire Department has recently made a test of the height at which an effective stream of water can be delivered from its engines, which shows that our tall buildings are better protected than is generally supposed. A fire engine was connected to the mains and to a standpipe that extends the full height of the St. Paul building, and succeeded in forcing a considerable stream of water from the roof—at a height of 307 feet above the street level. With a pressure of 180 pounds at the engine, the water was thrown over St. Paul's Church, on the opposite side of Broadway, and fell into the churchyard beyond, a horizontal distance of about 250 feet. Unfortunately, the failure of one of the couplings on the standpipe within the building prevented the test being made with the maximum pressure at the engine of 300 pounds to the square inch; but enough was done to prove that the engines of the department can deliver water at a satisfactory pressure on any of the floors of our tall buildings. At the time the standpipe failed the engine was throwing over 250 gallons a minute at a height of over 300 feet, with only 60 per cent of the maximum pressure.

While it is true that the tall buildings are provided with their own fire service in the shape of tanks on the roof or special fire pumps in the basement, experience has shown that the system is not very reliable. The tanks are liable to be empty, or the pumps may not be available because of insufficient steam supply in the boilers, or the whole plant may be crippled by the flooding of the basement during the progress of a fire. But by the new system, if a fire should break out in a building supplied with adequate standpipes and a good elevator service, the firemen will be enabled to command a good service of water on any of the highest floors within a few minutes after reaching the scene of the fire.

The failure of the standpipe in the St. Paul building suggests that the fire system of these tall structures should be put in under the rigid inspection of the Building Department; that it should be of ample capacity; and that it should not be passed by the department until it has been subjected to a test pressure considerably beyond that which will obtain in actual service.

A further development of the idea of having the service of these buildings operated by the engines of the Fire Department would be to lay down separate salt water mains at stated intervals from Broadway to the Hudson and East Rivers, with connections at the water front to enable the powerful pumps of the fireboats to be concentrated upon a fire. This system is already installed in some Western cities, and it provides a supply of water far in excess of any-

thing that could be secured by the use of the ordinary fire engines. A combination of both systems and the provision of ample standpipes in every tall building would render these structures practically proof against destruction, so great would be the flood of water that could be let loose upon a fire. It should also be borne in mind that these towering buildings would not only be indestructible themselves, but they would afford an excellent protection against the spread of a conflagration. Their great mass would form an efficient fire-screen, tending to localize an outbreak, while they would serve as giant watertowers, from the upper floors of which a vast amount of water could be thrown upon the burning buildings below.—*Scientific American*.



PORTLAND CEMENT MADE FROM SLAG.

PORTLAND cement from iron slag has been so profitably and successfully produced from the refuse at the Sparrow's Point Works in Maryland, and at the works of the Illinois Steel Company, that a plant is to be established at Birmingham, Ala. The supply of slag will be drawn from the Emsley furnaces of the Tennessee Coal and Iron Company, the plan being to have an initial capacity of 1000 barrels a day. Machinery has been ordered for the plant, which will be in working order, it is expected, in about four months. This utilization of what was heretofore a useless by-product of pig-iron works is one that promises to add largely to the profits of the ironmakers, even though the production of the cement, as in this Birmingham case, is turned over to an independent company.—*Boston Transcript*.

BOOKS AND PERIODICALS.

BRIDGES AND FRAMED STRUCTURES, an illustrated monthly magazine, has made its debut with the April number. It is published by The Ranck Publishing Co., Chicago, at \$3 a year. The initial number contains the following interesting and readable contributions: A review of the life and works of Sir John Fowler; Pneumatic caissons for ordinary foundations; Assumptions made to determine draw span stresses; The architecture of bridges; Modern Spanish bridge engineering; The bridge work's estimating department; Chemical and physical construction of steel. Measurements for granite viaduct.

The matter is well edited and digested as well as pertinent to the field of enterprise which the title indicates. The articles are aptly illustrated, and the magazine printed on good paper. We bespeak for it a wide field of usefulness.

TRADE NOTES.

THE Grand Rapids Carved Moulding Company are known all over the country as the only concern that manufacture the real thing in carved mouldings. There are imitators and pressed mouldings and pressed pot metal that is in use in ornament, but when you want the genuine article in carved mouldings the above firm are the people who can supply your wants. Why? Because they are cut, the wood is displaced. They bear the same relation to the hand carved work that the machine stuck or shaped mouldings of the present have to the old hand worked. They are more even and perfect than can possibly be produced by hand and at a very small per cent of the cost. Where can you find ornaments that are acknowledged as correct as the Egg and Darts, Dentals, Fliets, Beads and numerous others that they produce? Send for their catalogue. See advertisement on page iii.

THE TALLEST CHIMNEY IN AMERICA.

THE trade press throughout the country has been giving considerable time and attention to the tall chimney and the electric power station of the Metropolitan Street Railway Company, in New York. New York City will soon be the possessor of two of the largest electric power stations in the world, says *Clay Worker*, designed to furnish current to two street railways. The delay in introducing electric traction has been a very advantageous one, since it is now possible to utilize the latest advancements in electrical engineering in both the generation and transmission of high potential currents. A further advantage is the concentration of all

the current-generating machinery in a single enormous station, so located that coal can be obtained and ashes deposited at the lowest possible cost, and where an ample supply of condensing water is available.

Alternating current at high potential will be transmitted from this central station to small sub-stations scattered throughout the system, where it will be transformed to direct current at low voltage, and fed directly into the mains along the road. The new power-house has been designed for a normal output of 45,000 horse-power.

It will be divided into two parts, one containing the boilers and coal bins and the other the engines and generators. There will be 87 water-tube boilers arranged in three tiers, each having a maximum capacity of 800 horse-power. The storage bin will be capable of holding about 10,000 tons. The engine room will contain 11 engines, each direct-connected to a three-phase 6000 volt generator. The engines have a maximum capacity of 6000 horse-power each, but an economical load of about 4000 horse-power.

The most conspicuous feature of this new plant is the immense brick chimney, the largest ever constructed. A solid block of concrete 88x85 1-3 20 feet forms the foundation. Starting with a square pyramid base 55 feet on a side, it gradually diminishes until at a height of 15 feet from the ground it is but 40 feet, at which point it continues up to 80 feet, with a side dimension of 38 feet, 10 inches. At this height it begins to change to a circular section, which change is completed at 95 feet, from whence it continues with a taper of five sixteenths inch to the top. The ornamental top begins at a height of 317 feet, the chimney at that point having a diameter of 26 feet, 10 inches.

A 12-inch fire-brick wall extending up 85 feet divides the chimney into two semi-circular compartments, preventing the current of hot gases from one set of boilers having any influence upon the gases coming from the flues on the other side. About four feet below the floor of the lowest flue, the fire-brick lining of the chimney commences, and extends about 8 inches in thickness to 5 feet above the upper flue, and from that point, 4 inches in thickness up to 115 feet.

The weight of the overhanging enlarged portion at the top is counteracted by three steel rings, the first at a height of 333½ feet and the other two at 3 and 6 feet respectively above the first. In the thickest portion of the cap the brick work is 6½ feet thick, sloping off to 20 inches at the top. The chimney is protected at the top by an iron cap made up of 40 cast-iron sectors bolted together into a complete ring and anchored to a steel ring embedded in the brick work about 14 feet below the cap. The diameter of the cap at its widest portions is 35 feet and the inside or flue diameter is 22 feet, or the same as the interior of the chimney all the way up.

The chimney is well protected from lightning by ten copper rods, 1¼ inches in diameter, projecting 6 feet above the top, terminating in four pronged points, each tipped with platinum for about 2 inches.

The fact that mechanical draft will be used at the other station, will furnish available data for drawing interesting comparisons. This station will have four stacks of modern height, sufficient only to discharge above the nuisance level. Taking the cost of the immense chimney at about \$100,000 and the cost of the induced draft plant at about one-third of this, and considering interest, depreciation and all standing expenses, it will be very interesting to calculate the relative merits of the two systems of producing furnace draft.—*Clay Record*.

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

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

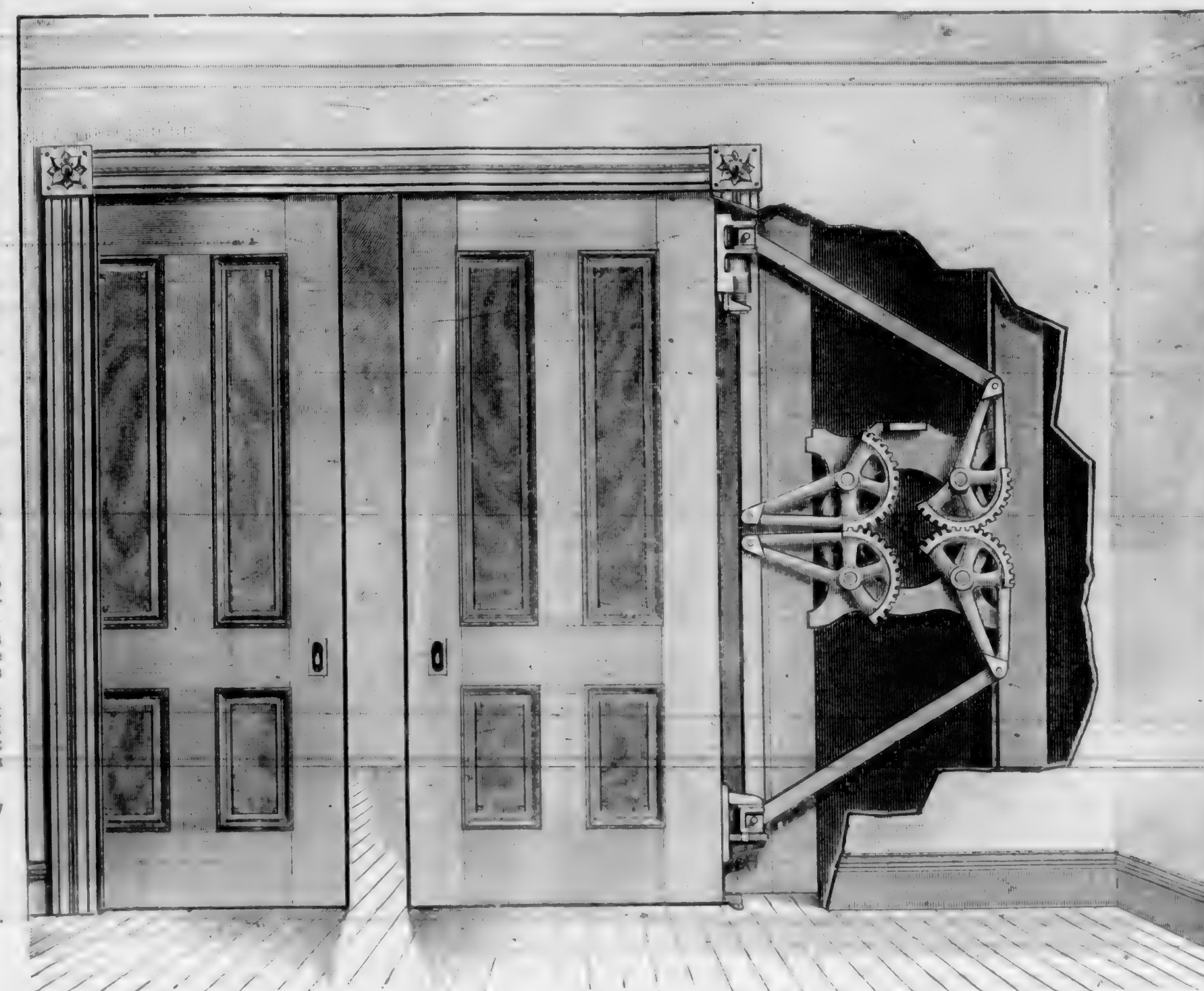
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Oils. S & Y PURE LINSEED Triple Boiled, Raw and Varnish.
Varnish. S & Y TRANSPARENT
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Ornaments. PRESSED WOOD
Casing Blocks. Corner, head, center and base blocks
Carvings. (WOOD)

INTERIOR FINISH

Ceiling. [STEEL CEILING]
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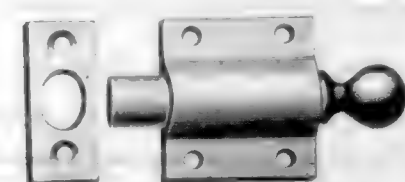
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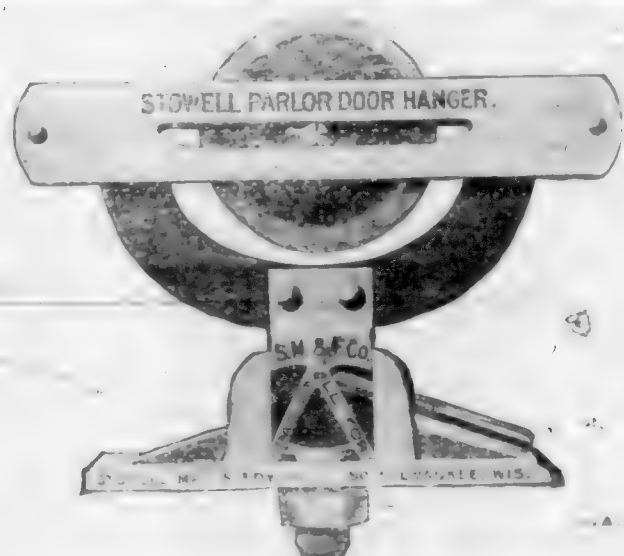
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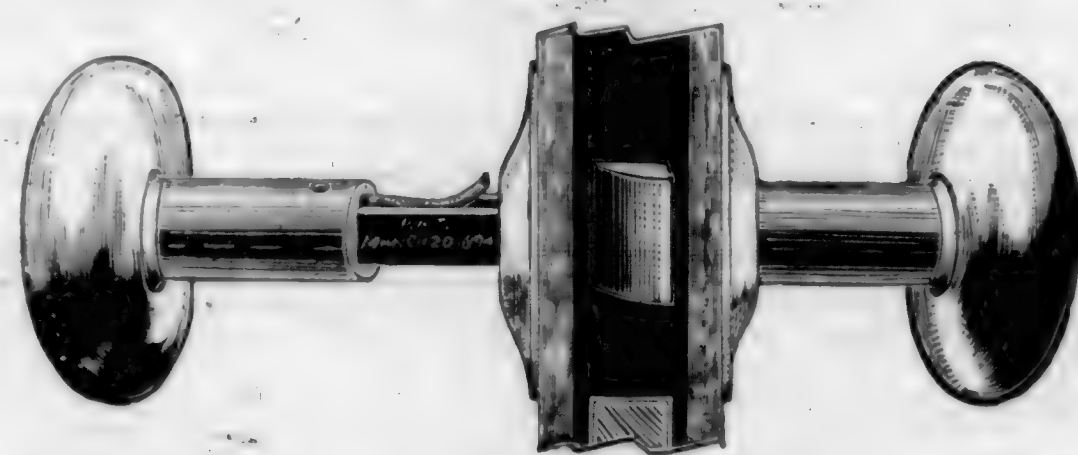
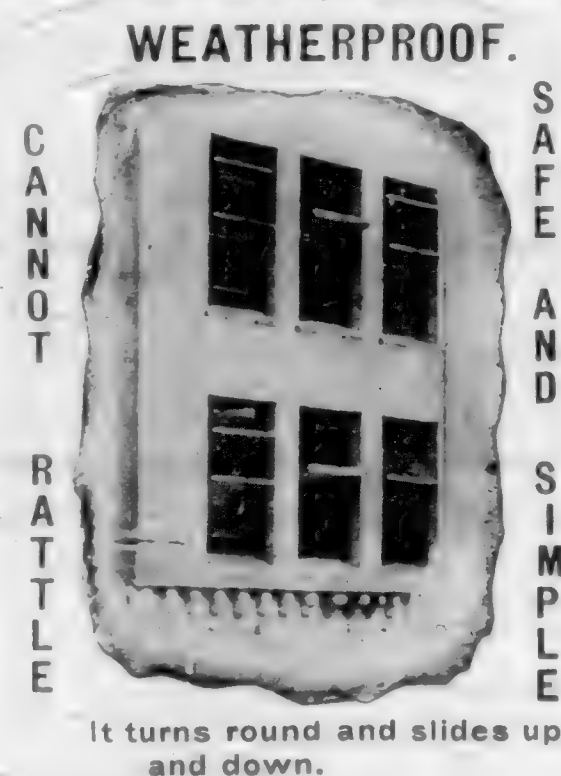
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TREASURY DEPARTMENT Office, Supervising Architect, Washington, D. C., May 18, 1899. SEALED PROPOSALS will be received at this office until 2 o'clock P. M. on the 20th day of June 1899, and then opened, for the construction, (except heating apparatus, elevator and electric wire conduits), of the U. S. Public Building at Helena, Montana, in accordance with the drawings and specification, copies of which may be had at this office or the office of the Custodian of the site at Helena, Montana. JAMES KNOX TAYLOR, Supervising Architect.

TREASURY DEPARTMENT Office, Supervising Architect, Washington, D. C., May 20th, 1899. Sealed proposals will be received at this office until 2 o'clock P. M. on the 22th day of June, 1899, and then opened, for Repairs to Stonework, etc., of the U. S. Branch Mint, San Francisco, Cal., in accordance with drawing and specification, copies of which may be had at this office or at the office of the Superintendent of Construction of the U. S. Post Office, Court House, etc., at San Francisco, Cal. JAMES KNOX TAYLOR, Supervising Architect.

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May, 1899.]

THE CALIFORNIA ARCHITECT AND BUILDING NEWS.

xiii

BUILDING NEWS.**ALAMEDA**

Euclid Park Track. To build; o. Capt. J. C. Eschen c. D. Straub & Son; cost \$6000.

St. Charles and Louisa. To build; o. E. H. & J. C. Lancel; cost \$3347.

BERKELEY

Bowditch and Channing. To build; o. S. J. Davis; a. Wm. Mosser & Son; c. Peterson & Persson; signed, April 26; filed, May 6; cost \$6550. Plumbing, etc; c. R. Rice; cost \$1510.

Crystal Spring Track, lot 9 block G. To build; o. Fannie Ashbury; a. J. T. Kidd; c. John E. Bigelow; cost \$1450.

Lot 45 block 3. To build; o. Mr. Harmon; c. John G. Adams; signed, April 13; filed, April 27; cost \$3700.

ELMHURST

Carpentry, etc; o. Josephine Wallace; a. J. r. Freeman; c. H. Wharton; signed, April 24; filed, May 5; cost \$12,970. Concrete, etc; c. Mr. Stone; cost \$2450. Mason work; c. J. A. Wilson; cost \$1225. Plastering, etc; c. W. C. Watson; cost \$1200. Plumbing, etc; c. Shepard Bros; cost \$2730. Painting, etc; P. N. Kuss & Co; cost \$1185.

OAKLAND

Broadway and Tenth. One-story brick; o. Lillian M. McPike, Nellie R. Lutz and Mary H. Miller; a. A. W. Smith; c. Ben O. Johnson; signed, May 16; filed, May 17; cost \$5194.

Jayne Ave. and Lee St. To build; o. Mary S. Cope; a. Cunningham Bros; c. Mr. Lake; cost \$44150.

Mountain View Cemetery. Granite coping, etc; o. Mt. View Cemetery Ass'n; c. Daniel Dwyer; cost \$2942.

Santa Rita Road. Alterations; o. Chas. B. Charlesworth; a. J. L. Welby; cost \$2110.

Thirty-second near Markes. To build; o. Fred and Zine Jepson; c. A. W. Pattiani & Co; signed, May 17; filed, May 20; cost \$1578.

HEALDSBURG

Two-story brick; o. Mr. Norton; a. Martens & Coffey; signed, May 1; filed, May 3; cost \$9000.

SAN LEANDRO

Factory; o. H. W. Bodwell; c. C. W. Duffie; signed, May 10; filed, May 11; cost \$2600.

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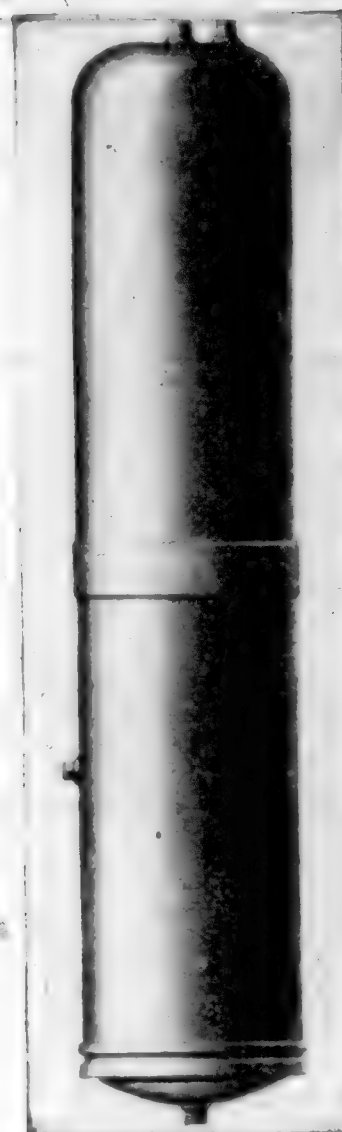
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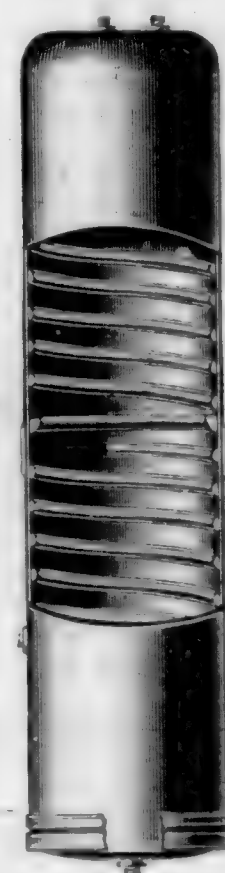
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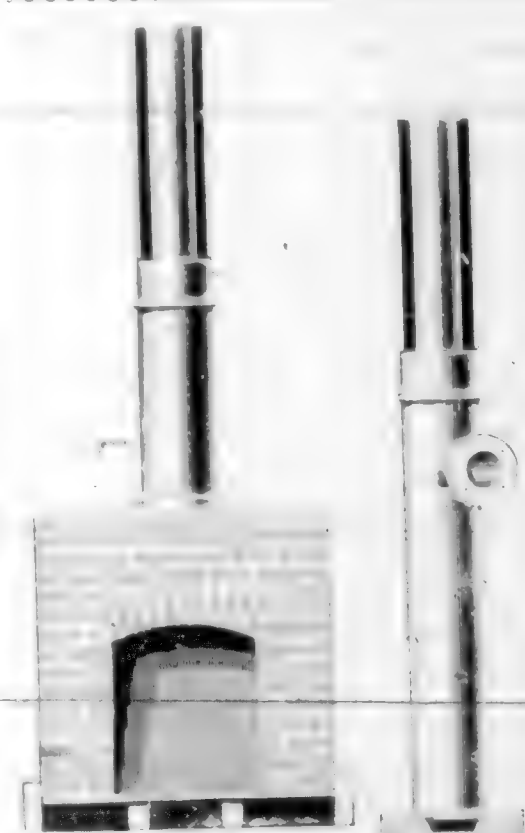
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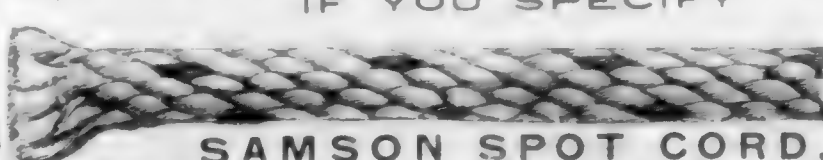
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VOLUME XX, No. 6.

JUNE, 1899.

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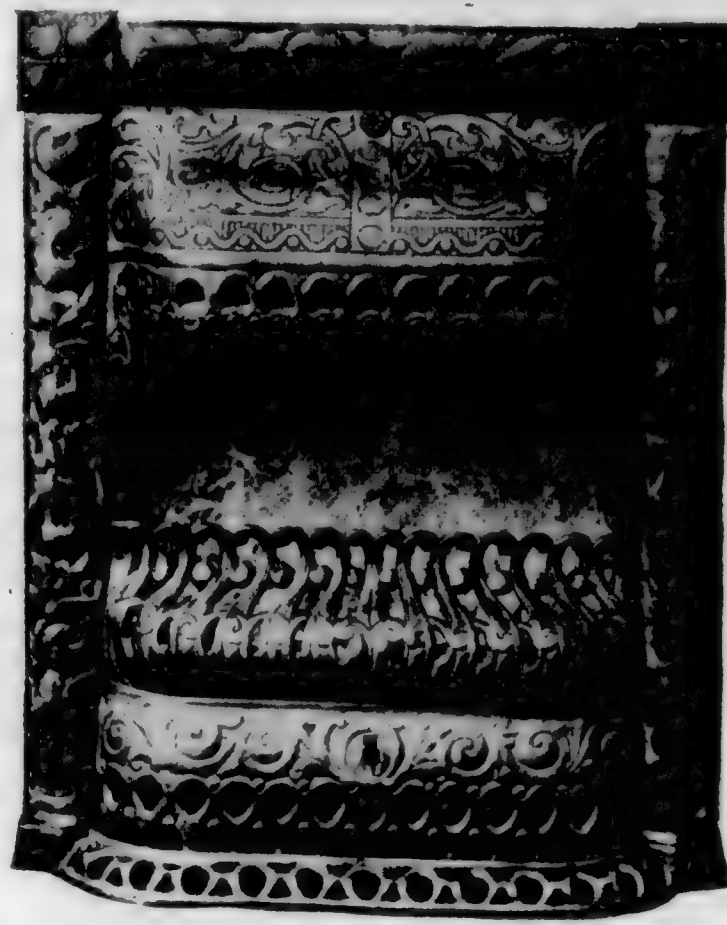
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BUILDING NEWS.

Broadway near Fillmore. Alterations and additions: o. B. Sheldeman; a. Salfeld & Kohlberg; c. J. Bucher; signed, June 18; filed, June 20; cost \$950. Plumbing, etc.; c. Ickelheimer; cost \$1125.

Bush and Battery. Concrete work; o. H. and S. Sachs; a. Salfeld & Kohlberg; c. Cal. Concrete Co.; signed, June 14; filed, June 17; cost \$1565.

California street, No. 1916. Alterations; o. Joseph Hyman; a. Percy & Hamilton; c. F. W. Kern.

California near Franklin. Painting, etc.; o. Kaspar Pischel; c. J. H. Keefe; signed, June 1; filed, June 5; cost \$1745.

Central Ave. near Page. Four two-story dwellings; o. D. Einstein; cost \$20,000.

Central Ave. and Page. Two-story frame; o. D. Einstein; cost \$6500.

Chestnut and Pierce. Filling in and grading; o. John N. Kennedy; signed, June 2; filed, June 8; cost \$16,237.

Clay near Laurel. To build; o. Chas. F. Hunt; a. E. A. Hermann; c. Peterson & Persson; signed, June 17; filed, June 20; cost \$8399.

Clay near Gough. Carpentry, etc.; o. Mrs. Marietta Sheeline; a. Salfeld & Kohlberg; signed, June 15; filed, June 18; cost \$5200. Plumbing, etc.; c. E. R. Tutt; cost \$1689.

Devissadero near Grove. To build; o. W. H. Mocker; a. R. Zimmermann; c. Chesney & Muller; signed, June 8; filed, June 9; cost \$1588.60.

Drum near Pacific. Additional story to brick building; o. A. B. McCreary; a. H. B. Maggs; c. J. W. Wissinger; cost \$7200.

Eddy street No. 430. To build; o. J. Moloney; a. Curtis Tobey; c. J. B. Gonyeau; signed, June 8; filed, June 18; cost \$3349.

Eighteenth and Stanyan. To build; o. Jennie E. Strauss; a. A. J. Barnett; c. W. R. Kenny; signed, May 25; filed, June 8; cost \$1600.

Ellis street No. 712. Alterations; o. A. G. McFarland; c. J. B. McKenzie; signed, June 8; filed, June 9; cost \$1,650.

Folsom near 6th. Alterations and additions; o. Aaron Shenson; a. C. M. Rousseau; c. H. Wilson; signed, June 20; filed, June 21; cost \$1385.

Fremont near Market. Re-building; o. W. R. S. Foye; a. Wright & Sanders; c. Robin on & Gillespie; cost \$33,452.

Geary near Grant Ave. Additions and alterations; o. Mr. Kliner; c. F. V. Acker; cost \$4000.

Golden Gate Park. Stone and brick work for music stand; o. Claus Spreckels; a. Reid Bros; c. Colusa Stone Co.; signed, June 14; filed, June 18; cost \$51,040. Concrete and cement work, etc.; o. S. Gillett & Co.; cost \$1637.

BUILDING NEWS.

Gough near Grove. Excavations, etc.; for two three-story frames; o. Ellen and Charlotte E. Dore; a. Thos. J. Welsh; c. S. A. Born; signed, May 24; filed, May 27; cost \$8000. Sewering, plumbing, etc.; c. James E. Britt; signed, May 24; filed, May 27; cost \$2237.

Grove near Lyon. To build; o. S. Garber; c. R. D. Cranston & Son; signed, June 12; filed, June 17; cost \$1250.

Haight near Steiner. To build; o. Andrew Burke; a. Shea & Shea; c. Paul Demartini; signed, May 27; filed, June 3; cost \$5250.

Jackson near Baker. Carpentry, etc.; o. Lizzie Peiser; a. Salfeld & Kohlberg; c. W. Horsmeyer; signed, June 16; filed, June 20; cost \$3651.

Jackson near Buchanan. To build; o. E. S. Tucker; a. Wm. Koenig; c. I. W. Coburn; signed and filed, June 3; cost \$4040.

Kearny and Washington. Metal grille work, etc.; o. City and County of S. F.; a. Shea & Shea; c. Geo. H. Fuller; filed, June 1; cost \$45,486. Gas and electric combination fixtures; c. S. E. Novelty Works; cost \$18,950. Water filter system; c. Cal. Art Metal Works; cost \$2450. Tinting and decorating; c. Geo. J. Smith & Sons; cost \$900. Electrical apparatus, etc.; cost \$3235.

Lombard near Fillmore. To build; o. Edward Ehrhorn and wife; c. Martin Weber; cost \$1150.

Lombard and Stockton. Alteration and additions; a. Deplere & Righetti; c. E. Daigero; signed, May 29; filed, June 1; cost \$2350.

Market and 5th. Electric elevator; o. Desire Fricot; a. I. I. Brown; c. W. L. Holman; signed, June 15; filed, June 19; cost \$2400.

Masonic Ave. near Frederick. To build; o. Kate W. Healey; a. A. R. Denke; c. Denke Bros; signed, June 4; filed, June 5; cost \$1592.

Montgomery near Pacific. Iron work, etc.; o. Ferdinand; a. R. Zimmermann; c. H. L. Peterson; cost \$1351.

Noe near 14th. Carpentry, etc.; o. John Stelling; a. A. Gellfuss; c. A. Howling; signed, June 15; filed, June 18; cost \$4425. Plumbing, etc.; c. Jos. Flood; cost \$1105.

O'Farrell near Powell. Carpentry, etc.; o. Emille M. Chabot; a. Shea & Shea; c. B. Dyrer; cost \$10,484. Brick, etc.; c. J. S. Fennell; cost \$14,198. Constructional steel, etc.; cost \$2947. Lath of expanded metal; c. Western Expanded Metal Co.; cost \$1035. Plastering, etc.; c. Floodberg & McCaffrey; cost \$2898. Plumbing, etc.; c. Allen & Looney; cost \$2879. Ornamental plaster; c. J. R. Schroeder; cost \$1340. Electric work; c. Will & Finck Co.; cost \$1835. Marble work, etc.; c. Lowry & Daly; cost \$1326.

Pacific Ave. near Octavia. Roofing, etc.; o. Abe Stern; a. R. Hunt; c. Conlin & Roberts; signed, May 21; filed, June 22; cost \$2490. Plastering, etc.; cost \$2893.

BUILDING NEWS.

Pierce near Filbert. To build; o. Mrs. Elizabeth Guehlberger; c. L. Cuneo; signed and filed, June 1; cost \$2250.

Page near Central Ave. To build; o. D. Einstein; cost \$4500.

Pine near Octavia. Painting and graining; o. Jonas Schoedfelt; a. Salfeld & Kohlberg; c. Lutge & Nagel; cost \$1450. Plumbin., etc.; c. Ickelheimer; cost \$4950.

Russ street Nos. 114 to 120. Addition; o. R. McNeil; a. M. J. Welsh; c. S. Doyle; cost \$3000.

Second and Stevenson. To build; o. J. S. Morgan; a. Havens & Toepker; c. Weismann & Whittle; signed, June 3; filed, June 9; cost \$17,220.

Second and Minna. Elevators; o. Christian Froelich; a. A. Sutton; c. Cahill & Hall; cost \$1800.

Seventeenth near Howard. To build brick; o. City of San Francisco; a. Shea & Shea; cost \$16,925.

Seventeenth near Channel. Fire-proofing, etc.; o. City of San Francisco; a. Shea & Shea; c. D. T. Pierce; sub-c. Western Expanded Metal; signed, June 9; filed, June 21; cost \$4300.

Spruce near Sacramento. To build; o. Margaret K. Foulkes; a. J. Mora Moss; c. C. M. Depew; signed, June 10; filed, June 14; cost \$3725.

Steiner near California. To build; o. William Trost; c. C. Zwierlein; signed, May 27; filed, May 31; cost \$1275.

Sutter near Grant Ave. Wainscoting, etc.; o. Goldberg; a. Edward R. Swain; c. California Marble Co.; signed, June 16; filed, June 20; cost \$1030.

Taylor and Post. Painting and decorating; o. Congregation Sherith Israel; a. Salfeld & Kohlberg; c. D. Zelinsky; signed, June 10; filed, June 15; cost \$1200.

Tennessee near 23d. To build; o. Thomas and Alice M. Cummings; c. Wm. W. Redhall; signed, June 7; filed, June 8; cost \$2310.

Third and South Park. Three-story frame to contain 10 flats and 8 stores; o. James D. Phelan, Alice P. Sullivan, and Alice Phelan executors of Phelan estate; a. Curlett & McEwen; c. A. McElroy; signed, June 8; filed, June 9; cost \$25,974.

Twenty-sixth near San Jose. To build; o. Mr. Corvell; cost \$1800.

Twenty-third and Noe. To build; o. Jacob Kugel; c. J. T. McInnis; signed, May 23; filed, May 27; cost \$3705.

Turk near Webster. To build; o. Wm. Rotrosky; c. P. Rive; signed and filed, June 8; cost \$4231.50.

Union Square Ave. near Grant Ave. Brick building; o. Bernard Schweitzer; a. Percy & Hamilton; c. J. W. Miller; signed, June 6; filed, June 10; cost \$3178.

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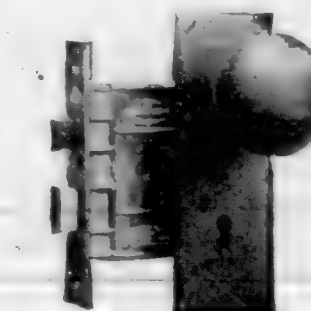
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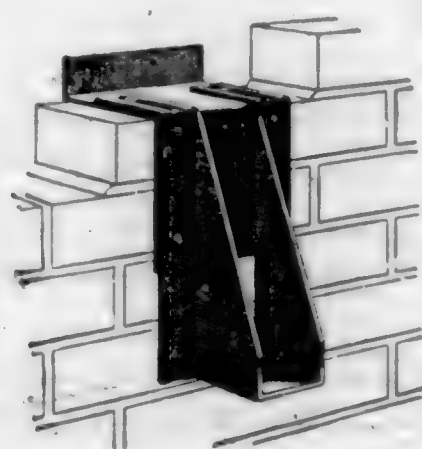
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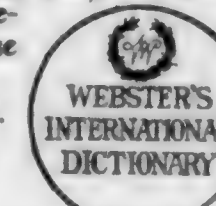
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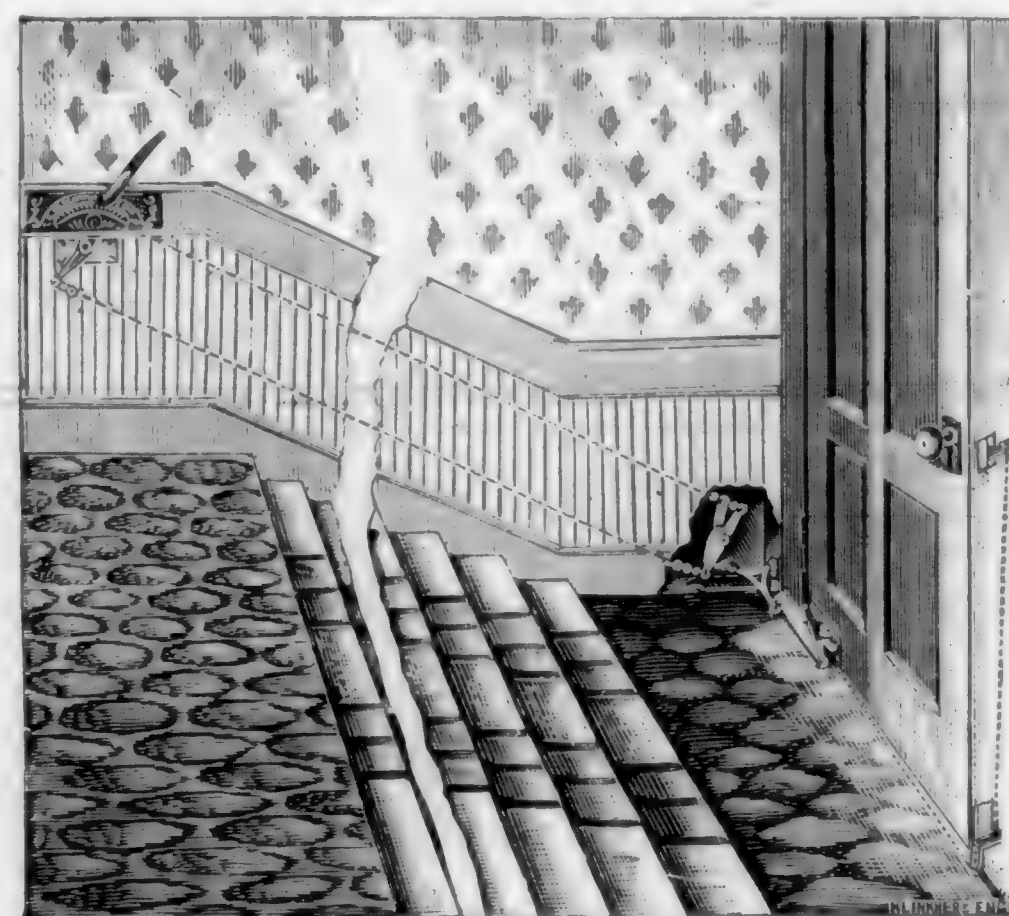
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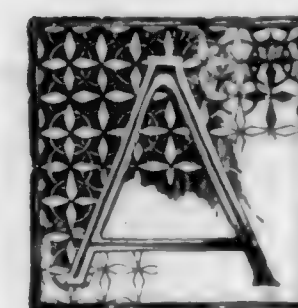
VOLUME XX.

JUNE 20th, 1899.

NUMBER 6.

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

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



AS A FEATURE in building designs, color is receiving some attention. There is here a field for exploitation, the subject being one of greater interest than at the first glance appears. Aesthetically it belongs to high art, and should be handled by artists in color, and by students of art such as Ruskin.

There is, moreover, the natural side to it, nature being the first teacher of art. Nature decrees that the sky and the sea should be blue or gray, in different shades; that the earth should be brown, in many shadings, from the yellow brown of the desert to the dark muck of the bog; and that the herbage and foliage that cover the earth should be in various tints of green. Gray is also a strong hue on nature's palette. With this she paints rocks and the stems of trees, and softens her too vivid greens everywhere they occur in large masses.

But nature does not confine herself to these general colors.

She illumines the sky occasionally with rainbows and clouds edged with the strongest prismatic hues. She decorates the fields with flowers of many dyes, and plants in endless shades. She variegates her rocks, and richly colors her minerals. She beautifies with consummate skill inorganic, organic, and animal life by means of her wondrous pigments.

All this is for some purpose. The color scheme of the universe is intentional. It is not an accident nor a vagary of the infinite mind. That it largely contributes to the welfare and happiness of man there can be no question. That we have failed to appropriate to ourselves all the good there is in it, goes without contradiction. But how to make it apply to our house-building—that requires some thought.

If we were to undertake to follow the painter of the Universe, we should make all large masses of building of some quiet color, using brighter tints only for decoration, and that sparingly. But we moderns have not yet ventured upon the experiment to any considerable or appreciable ex-

tent. No doubt we shall make many blunders before we master the art of building houses singly, or in rows, made beautiful by color effects.

There is something, however, which can be done in the interest of dwellers in cities—and especially in the city of San Francisco—whose eyes are being ruined by having to see by sunshine reflected from light-colored walls. Bad as it is to strive to see by insufficient light, it is worse to have to endure the torture to the eyes which comes from the glare thrown into rooms from neighboring house, painted, as a majority of San Francisco houses are, of a tint closely resembling the sands of Sahara. The desert itself could hardly be more fatal to vision than this reflected light inflicted upon helpless dwellers in buildings on the north or the west side of lots or streets built up on the opposite side with these colorless houses.

The effect of such light upon the optic nerve is entirely different from that of pure sunshine. Your room may be flooded with sunshine and no harm come to you, but light thrown against a wall and returned into your eyes, has the same effect that is produced by shimmering water or bright metal. Yet thousands of women sew, or write, or pursue other nerve trying occupations in just such light. Doubtless also, some schools are similarly situated, and the children are having their eyes ruined. Men's offices do not suffer so much from this cause, being in more closely built up districts, and among darker walled buildings.

Here is an opportunity for experiment in house coloring. From the expedient we may reach the beautiful, and cities be made studies of art instead of ugliness. Science must be invoked even in such matters as house painting.

ARCHITECTURE OF THE AMERICAN COLONIES.



HERE is no such thing in America, in the United States, at least, as a distinctive order, or a strictly American style of architecture. The aboriginal dwelling was usually a moveable one, owing to the wandering habits of the native races.

Those tribes who lived by fishing, hunting and corn-growing, as along the Atlantic Coast, built more substantially, out of logs and bark of trees, than those on the western prairies who lived by the chase and root digging. These being almost constantly on the move, sheltered themselves in tepees or tents of a circular or conical form, with an opening at top for the passage upwards and outwards of the smoke of their fires. Constructed of dried skins of animals, they were impervious to wind, and protected their inmates from the cold of the severe winters of the plains, especially as they were usually placed in sheltered locations.

Still farther west, under the milder skies of the Pacific Coast, a brush tent, or wickiup, sufficed for the gathering place of the family, and could be abandoned at pleasure. This was the style of dwelling of the California coast tribes. But farther north, in and above the Columbia River region, rude houses were constructed of planking made out of the easily split cedar of the northern coast.

These houses consisted of a basement a couple of feet in depth, often of from thirty to fifty feet in length, and twenty or thirty feet in width, over which was built the wooden

part of the structure. This was done by setting posts at the corners, and between, to which the planking was fastened by such means as were at hand. The wooden walls being set back two or three feet beyond the earth wall of the basement, left a bench of earth quite around the interior, which, being covered with grass matting, and skins, served for seating and sleeping accommodations. The roof, of planking and cedar bark, was supported by a ridge-pole and stringers. The only light admitted came through the doorway, which was at one end, and a square opening in the roof, left for the escape of smoke, the fire being built upon the earthen floor in the center of the house. It will be perceived that this dwelling, which cannot be classed under any recognized style, belonged nevertheless to what is known as the trabeated, or beamed style, like the Egyptian and Grecian structures. It is easy to trace the differences to their causes, while recognizing the single underlying idea of an oblong structure, with upright posts or columns in certain positions, and flat, or nearly flat, roofs.

Still farther north, indeed, we come upon detached columns outside the walls, rudely carved with genealogical emblems, or tokens, much after the Egyptian example of a goddess-faced capital. The human intellect, it would appear, starts out upon similar lines of progress throughout the world.

The first buildings by the white races in America were mere make-shifts—architectural accidents—due to unusual circumstances or exigencies, like those found at Newport and Woods Holl, Rhode Island, believed to have been erected by Norsemen, about 1507. That one at Newport, known as the "Old Mill," is a round structure of stone, supported upon short pillars and arches, in the early Roman or Etruscan style. The other, at Woods Holl, is also round, and of stone, but is built up from the ground, and has a battlemented top. It is without openings in the wall, except the entrance, and narrow windows immediately under the cornice, suggesting the idea of a fortification.

The second oldest building by white people in what is now United States territory, and the oldest known residence, is in St. Augustine, Florida, which was settled in 1564, when the monks of St. Francis erected this house for their occupation. It is constructed of coquina, a mixture of sea shells and mortar, which forms a cement as solid as natural rock.

Sir Francis Drake, while roving the seas in quest of riches, in 1585, destroyed the town of St. Augustine, but was unable to demolish this monastery. Its age, quaintness of design, and historic interest, has of recent years lead to repairs, and to its preservation as a museum, where has been gathered relics of past centuries. The round tower and the walls of the lower story are intact, the latter being sustained by heavy buttresses. The frame work of the second story gives evidence of being more recent by a century; and some even more modern features appear, in windows and balconies.

A deputy of the Spanish government in 1590 came into possession of the building, which remained in the family until 1882, when it was sold to Dr. C. P. Carver, who more recently transferred it to J. H. Henderson, Esq., the present owner.

A feature of the house is a curiously designed door-knocker

of wrought iron, weighing twelve pounds, which was taken from the ducal palace of Ponce de Leon in Seville, Spain. Evidently, it was not intended that the inmates should yield too much to the sleepy influences of the Florida climate.

The furniture of the house is antique. Among the art treasures are an elaborately carved bedroom set of the time



The Oldest House in the United States at St. Augustine, Florida

of Louis XII, and a rosewood sideboard which was the property of Napoleon I. On the walls are paintings by the old masters once the property of the Spanish nobility. To these relics have been added a collection of ceramics representing all the rare colonial designs, including the Martha Washington plate, presented by La Fayette and other Frenchmen.

This building gives us the first and the last glimpse of a power which once possessed the continent. It is the irony of fate that just as every vestige of former empire is being wiped off the map of the new world discovered by Spain, we, her latest conquerors, should be carefully preserving relics of her earlier occupancy. We pay to a glorious past the reverence which even a recreant present cannot overcome.

There is still standing in Jamestown, on the Potomac, the bell-tower of a church erected by the first colonists of Virginia in 1610—three years only after the settlement of that place. The building was sixty feet in length by twenty-four feet in breadth, and constructed of brick. It had "a baptismal font, a tall pulpit, a chancel of red cedar, and in the tower two bells." The tower, which is still as firm as stone, stood over the vestibule, which had an arched entrance.

This first Protestant church in America was the type after which colonial churches were built for many generations, and after which they are still built in new settlements generally—the steeple, with a single bell, being substituted for the more costly and dignified tower. The portico was often omitted, puritanic plainness dispensing with whatever was unnecessary, or paucity of means rendering architectural effects impracticable. But churchbuilding for at least two centuries adhered to that early Christian type, which, as we have seen, was born in Rome, and was descended primarily from the Egyptian plan of temple-building. The Gothic graft which modified it fourteen hundred years later still continues to derive its sap from the ancient root.

Williamsburg, the old capital of Virginia, was the seat of the second church in this colony, and was founded in 1632. As befitted a church of England edifice, where royal gov-

ernors and other titled personages joined in the liturgy, and listened to mild discourses upon the divine right of kings, was a more costly building than its predecessor, as well as a larger one.

Families of ordinary mortals sat in large square pews, much at their ease, but the king's representatives and their families sat in the "royal gallery," a room of considerable size, which they entered and departed from by a private door, as did royalty itself in Old England. An American lady, a republican, is to-day supporting similar vice-regal customs in the Queen's possessions in the East Indies. "So runs the world away."

There are no detached columns in the Williamsburg church, which is still in a good state of preservation, but simulated square pillars support the cornice beneath the ceiling, which is decorated. There are tall arched windows, and a square altar-rail guards the sacred and spacious enclosure where stands the reading desk, and the actual gray marble baptismal font from which the Indian princess Pochahontas was baptised into civilization, and marriage with John Rolfe. The silver communion service was a gift of Queen Anne.

William and Mary College, built in 1693, and burned, was rebuilt in 1705, and may be taken as an example of college architecture in the latter part of the seventeenth century. Sir Christopher Wren had furnished the plan of the original building, which is now lost. That which succeeded it is a severely plain two-story structure, with a long frontage, and having many right-angled windows at equal distances apart. The roof is low, rather than high, and hipped at the ends. It has a portico, carried up to the roof, supported by arches, and supporting a pediment above the cornice. A small cupola or bell-tower rises from the center of the roof. Many similar college buildings have arisen all over the United States—all equally repellant to the artistic sense.

The house of the president of the college was built of brick made in England, of two colors, red and gray, used to present a checkered effect, a fashion which prevailed in the mother country two centuries ago.

A hundred years had brought to the colonies many of the architectural ideas prevailing or developing in England. These were not of the better sort, for art was again in a decline. Such as they were, they were modified and adapted to the climatic and other conditions in the new world.

The style of house most in favor with the Virginians was square, or nearly so, with a wide hall in the center extending through it, and large rooms opening on either side. A feature rarely omitted was the wide portico, with columns usually extending to the roof, and supporting a pediment. If the roof was low, it was hipped; if high, it had also dormer windows. Wings and supplementary buildings were added as required, but this was the central plan of the colonial "mansion house." The spacious hall had a grand staircase, sometimes spiral, sometimes with square landings to break the steep ascent, and with niches in the wall for statuary, or a place for the high-cased eight-day clock. The balustrade was high, and the posts supporting the rail often quaintly twisted or carved. If the house were large, the long hall might be divided by arches. In the immense rooms were fireplaces with decorated mantels of the hardest

wood or the finest marble. The furnishings were imported from Europe, and indicated the taste or the wealth of the owner.

The Dutch, who settled New York in 1614, brought with them from Holland certain architectural tastes and predilections, which were shown in the thick walls of their low houses, their steeply-pitched and windowed roofs, and the indispensable "stoop," wherever it could be attached. Like the Virginians' portico, the stoop was the hospitable reception-room of the house.

In that rare and delightful book, "An American Lady," by Mrs. Grant of Scotland, is the following concerning the Dutch manner of living at Albany in ante-revolutionary times:

"The city of Albany stretched along the banks of the Hudson. One very long wide street lay parallel to the river, the intermediate space between it and the shore being occupied by gardens. A small, but steep hill rose above the centre of the town, on which stood a fort, intended (but very ill adapted) for the defence of the place, and of the neighboring country. From the foot of the hill another street was built, sloping pretty rapidly down until it joined the one before mentioned that ran along the river. This street was still wider than the other: it was only paved on each side, the middle being occupied by public edifices. These consisted of a market place, a guard-house, a town hall, and the English and Dutch churches. The English church, belonging to the Episcopal persuasion, and in the diocese of the Bishop of London, stood at the foot of the hill, at the upper end of the street. The Dutch church was situated at the bottom of the descent, where the street terminated. Two irregular streets, not so broad, but equally long, ran parallel to those, and a few even ones opened between them.

The town, in proportion to its population, occupied a great space of ground. This city, in short, was a kind of semi-rural establishment: Every house had its garden, well, and little green behind; before every door a tree was planted, rendered interesting by being co-eval with some beloved member of the family. Many of their trees were of prodigious size and extraordinary beauty, but without regularity, every one planting the kind that best pleased him, or which he thought would afford the most agreeable shade to the open portico at his door, which was surrounded by seats, and ascended by a few steps. It was in these that each domestic group was seated in summer evenings to enjoy the balmy twilight, or the serenely clear moonlight.

Each family had a cow, fed in a common-pasture at the end of the town. In the evening the herd returned all together, of their own accord, with their tinkling bells hung at their necks, along the wide and grassy street, to their wonted sheltering trees, to be milked at their masters' doors. * * * A town which contained not one very rich or very poor, very knowing or very ignorant, very rude or very polished, individual. * * * These primitive beings were dispersed in *porches*, grouped according to similarity of years and inclinations."

Of New York Mrs. Grant says: "Society was there more various and more polished than in any other part of the continent. * * * Unless a man, by singular powers or talent, fought his way from the inferior rank, here was hardly an instance of a person getting a subaltern's commission whose birth was not at least genteel, and who had not interest and alliance."

These allusions to New York colonial customs help us greatly to understand architectural features. The long, low, hip-roofed house of Albany, or of the manors along the Hudson, became in the capital city the aristocratic three-storied house of brick or stone, but without losing its distinctive Dutch style. New Jersey, also settled by the Dutch, still affords many examples of colonial buildings—of houses constructed of brown stone, the blocks thick enough to furnish window-seats eighteen or twenty inches deep.

These houses have, usually, the main building of one-story and an attic, in whose steep roof dormer windows are inserted; and a wing at one end, without the attic, which was devoted to domestic uses. Stout oaken doors, called "Indian doors," that opened across the middle, immense fireplaces and high mantels, with cupboards in every available space, were interior features of these houses, that often contained imported furniture and pictures of great value.

Perhaps the best example of the New York manor house is that of the Philipse family, at Yonkers, erected in 1682, which is in a good state of preservation. The plan is simply that of an oblong building of considerable size, and two-stories high. The roof is a mansard with dormer windows, and a balustrade running around the flat space at the top. The main entrance is by a door in the front end, which opens into a central hall. A small square portico, the roof of which slants forward from the wall, and is supported at the corners by two columns, shelters the doorway.

The windows, of which there are two on each side of the entrance, and five in the story above, are oblong, with twenty-four small panes of glass in each. Windows are placed at equal distances on the sides, six in the lower, and eight in the upper story. Two doors open on the side which faces a street, one having the porch with seats, the other being a walled porch, or "winter door," and leading to the kitchen. A delicate cornice is carried along the side of the building over the lower windows and doors, and a heavier one, of the same design, beneath the roof.

Certainly, a very plain, unostentatious house. But on the interior was lavished a wealth of decoration, architectural and applied. Painted ceilings, columns supporting tall carved mantels and mouldings, doorways crowned with sculptured pediments, handsome staircases, with quaintly-fashioned balusters, rich imported furniture and selections from European art-galleries revived in colonial homes recollections of a more settled, but scarcely more enjoyable existence over seas.

The Jumel mansion, or Fort Washington, in New Jersey, is an equally good example of the suburban New York mansion. It is in a style very similar to that of the Virginia town, or suburban house, being of brick, nearly square, with the imposing Roman portico whose pediment rises above the cornice of the upper story, supported by columns in the graceful Ionic order. The roof is hipped and balustraded, with the further relief from plainness afforded by a central chimney and a single painted dormer window. In the rear is a second detached building in a similar style, where the servants were quartered.

The interior of this house, built in 1758, at Harlem Heights, was finished and furnished as not many American houses were in that day. It had been erected by Roger Morris for his bride, Mary Philipse. In 1810 it passed into

the hands of Stephen Jumel, a merchant of New York, who had married the beautiful Miss Eliza Bowen of Providence, Rhode Island. His wedding gift to her was this now celebrated mansion, which was refurnished with all the splendors of the wealth and taste of the period.

In addition to the contents of drawing room, dining-room, hall, tea-room, and many private apartments, was a gallery of paintings selected from art centers in Italy, France, Holland and Germany. Twenty-five thousand dollars was paid to the widow of a French count for furniture and jewels which had belonged to Napoleon I and Josephine, including articles which had previously belonged to Charles X.

After the death of Mousieur Jumel, his widow married Aaron Burr, whom she outlived, dying at the age of eighty-nine, in 1866. From first to last the house on Harlem Heights, back of Jersey City, sheltered at different periods the most distinguished personages of colonial times, military and civil, royalist and republican.

Turning to the New England colonies, we find a prevailing style not altogether dissimilar to the Dutch, yet with characteristics of its own equally well marked. Lands were



not possessed in large holdings by individuals, as in Virginia and New York; hence we have not the manor-house with its aristocratic dimensions and accessories, but the farm and the town house. The former was, for the first century, a very plain, and often a very uncomfortable residence. It seldom achieved more than a single story, with a steep roof that slanted backward from the ridge pole, covering the lean-to. The door was in the middle of the front, opening directly into the kitchen or living-room, and without the shelter of a porch. The windows were few, and glazed with small panes. Before the door was a flat stone, in place of steps.

This entire absence of architectural effects in the early New England house was not so much the expression of the English Puritan character (although undoubtedly it affected that of their descendants, as it was a revelation of the poverty of their resources and the qualities of the climate. Having to contend with a niggardly soil, short, scorching summers, and long arctic winters, at the same time defending themselves from Indian attacks, left little time to think of anything beyond the primary wants of existence. Whatever pause came to them was required by their religion, in

the cultivation of that self-abnegation which their circumstances called for.

The interior of the early New England homestead was in keeping with the exterior. The kitchen was the only habitable room in winter. Whatever of comfort it afforded was imparted by the immense fireplace and chimney, where during the winter months the hardwood logs were kept burning continually. When bed-time came the huge "back-log" was heaped over with coals and covered with ashes, as carefully as a steamer's engineer banks his fires when his ship is at rest. If it chanced that a heavy snow storm sifted an avalanche of snow down the wide chimney during the night, so much the worse for the early riser next morning. To the New Englander fire-worship, should have seemed perfectly logical.

In commending the ventilation afforded by colonial "interiors," where the "great room" of a mansion might have nine doors, and a chimney twelve feet square at its foundation, we must not forget the frequency of deaths by consumption, and the sufferings of rheumatic old age, consequent upon the unavoidable draughts. Our colonial ancestors usually had several wives in the graveyard, and a good many of the fathers died before their time.

Notwithstanding these drawbacks, as time wore on the homes of New England gradually acquired, and by very reason of the difficulties to be overcome, more of the real comforts of life than those of the more western or more southern colonies. All the exigencies of Indian wars, hard winters and hot summers were provided for.

Brick and stone houses were erected with particular care for their solidity. Wooden buildings were constructed with double walls interlined with brick, to resist Indian bullets. Hidden closets and under-ground passages were in some instances provided, with a view to the safety of the family in case of attack. Attached to the kitchen was the wood-house in which the year's store of cordwood was neatly piled. Close by, and often under its roof, was the well which supplied the household with water. In the tightly-walled and capacious cellar were bins for fruit and vegetables. Somewhere off the kitchen were the pantry and dairy.

In supplying these numerous needs, colonial domestic architecture became picturesque by its very homeliness. The better class of houses in the early part of the eighteenth century were still severely plain on the exterior, with steep roofs, giving if needed, extra rooms in the attic, which usually however, was used for storing unused articles, and relics.

The increase of wealth, and the residence among the colonists of royal appointees, led gradually to the introduction of more varied and attractive styles. Porches, pediments, balustraded roofs, projecting wings and gables, marked the later colonial dwellings. But the stately, columned manor house of New York and Virginia was never a feature of New England.

If we would study the life of the first half-dozen generations of Americans in this quarter of the United States, we must look for it at the fireside, in the library, or in the halls of old Harvard, founded in 1638, when Massachusetts Colony was but eighteen years old. The founders turned from heavy toil and savage warfare to religion, philosophy, poetry, and patriotism, and were ever busy in "building better than they knew," the only really free republic on earth. They could afford to wait for results.

When we speak of colonial architecture, it should be re-

membered that the several colonies represented separate nationalities, and that America, like Rome, drew to itself many peoples. Without the wealth of Rome, it adopted that which was most convenient, rather than that which was artistic. It will be well for us when our day of luxury is at hand, if we observe, as did the Greeks, simplicity with refinement.

THE ELDORADO SCHOOL BUILDING, STOCKTON, CAL.

WE PUBLISH in this issue, accounts of three recently erected Public School Buildings in this State. During the last five years more attention has been paid to the con-

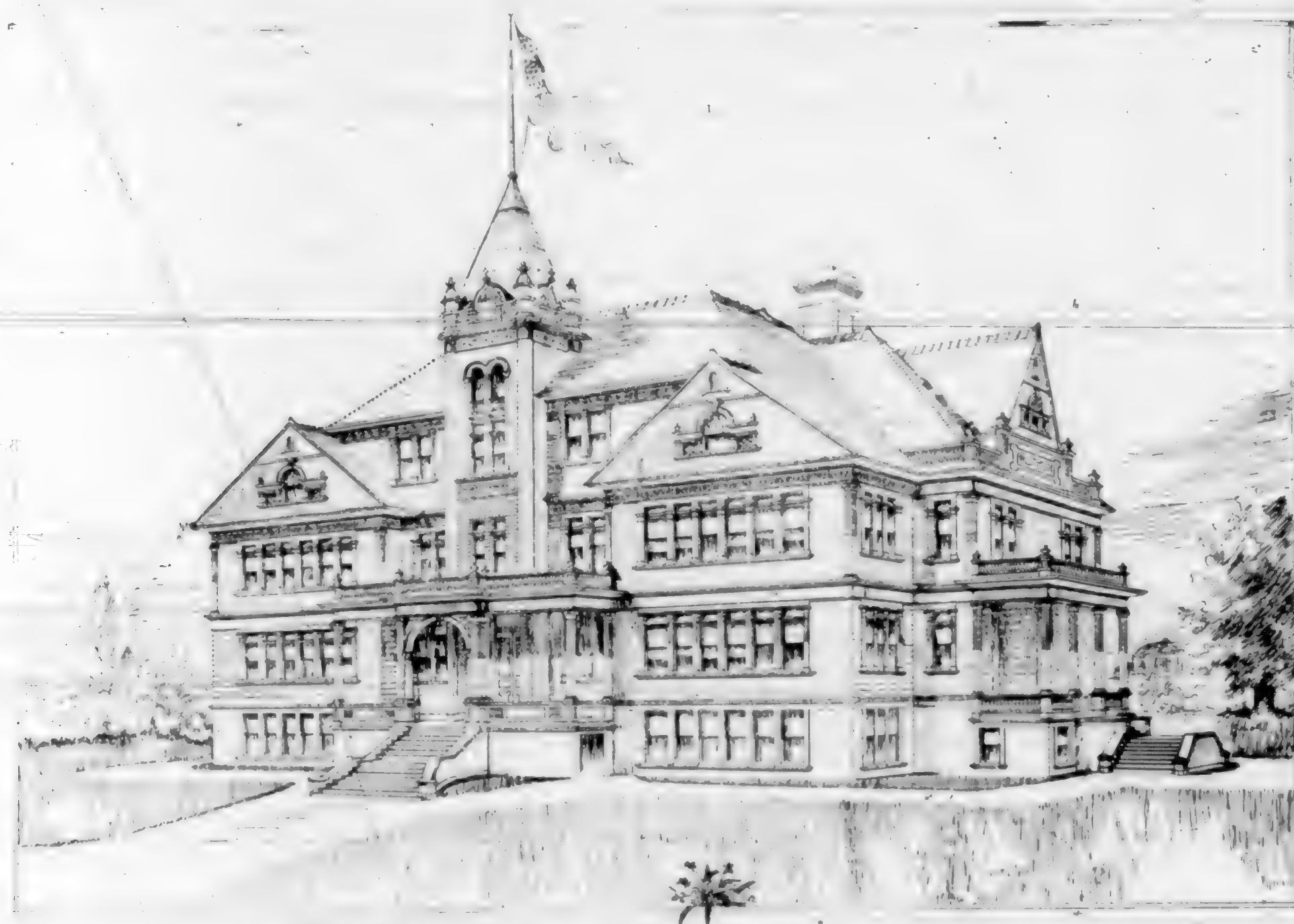
struction of this class of building than ever before, and the work has resolved itself into various specialties, the architect assuming the general responsibility for the exterior design and planning the interior to best meet the requirements.

The matter of "lighting" has been one under discussion for several years and has resulted in the general acceptance of strong light from one side of class room only. Recent opinion also proves "green" in place of "black" for the boards in the room. Perhaps of all specialties, the one commanding the most thought and attention at present time is the matter of proper "warming and ventilating" and thorough sanitation of this class of buildings. Every thinking man will at once realize the importance of pure air in these crowded class rooms and how to obtain this at a nominal expense has engaged the thoughts of leading engineers and mechanics throughout the world.

From the above it would appear that one duty of the architect, at the present time, is to give his clients the benefit of whatever he may know or possess and also (by being well informed as to the various specialties) by combining the knowledge of several, give his clients a completed structure possessing all the modern features that make a building perfect.

In the matter of "plumbing" and "sanitation" work a like advancement has been made and the toilet rooms in these buildings are as free from disagreeable odors as are our parlors in our private homes.

A recent report from the Board of Health, on the "heating, ventilating and sanitary system" in the El Dorado School Building, Stockton, Cal., in connection with this subject, will be of interest.



EL DORADO SCHOOL—W. W. OATES, ARCHITECT.
Warmed and ventilated by Morgan & Co.

STOCKTON, CAL., Dec. 23, 1898.

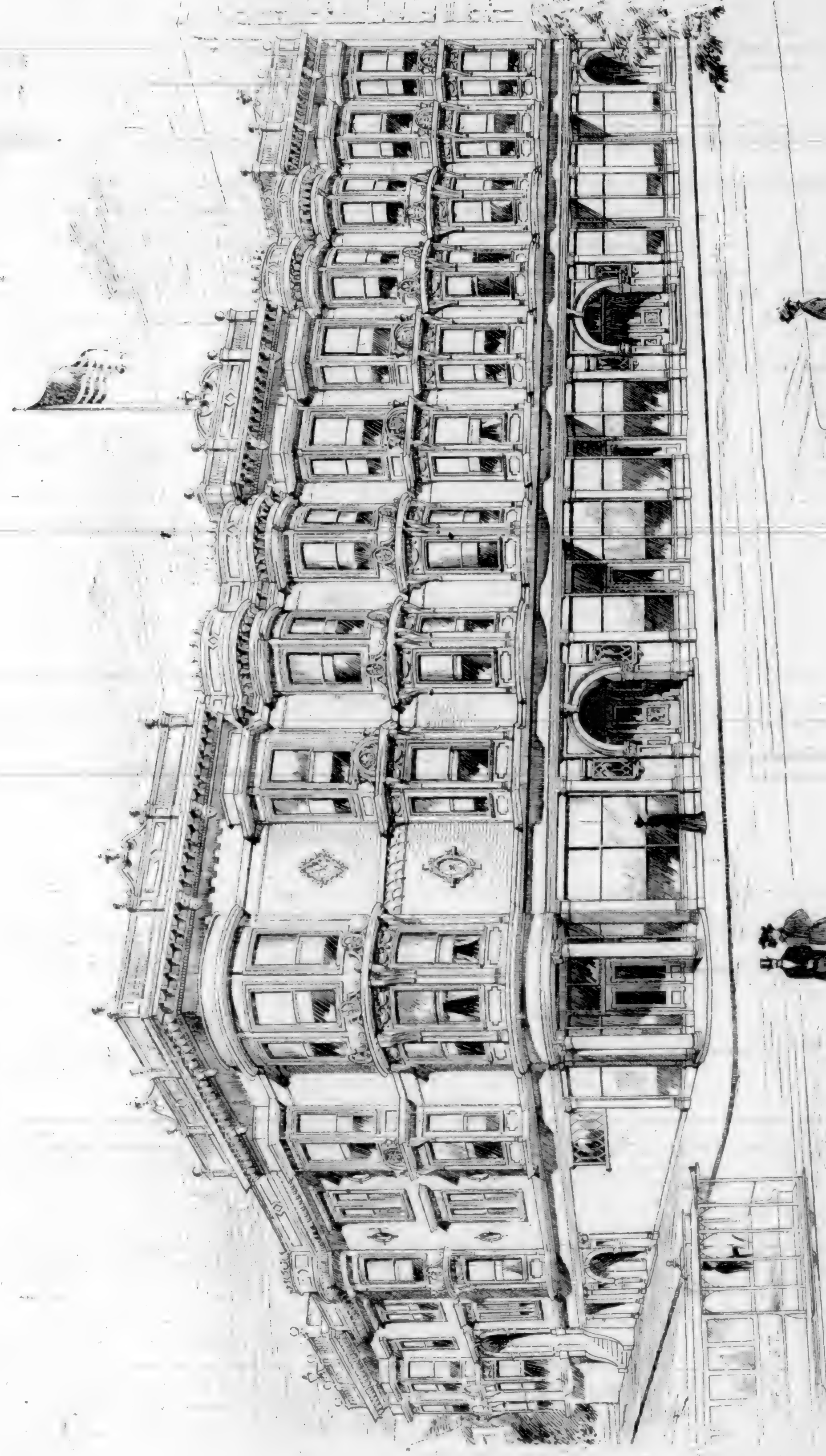
To the Honorable Board of Education of the City of Stockton.

LADIES AND GENTLEMEN:—The request of your Honorable Body that the Board of Health examine the heating and ventilating system and water flush closet apparatus inserted in the El Dorado School Building, was referred by said Board to the Committee on Public Buildings, consisting of the undersigned and Dr. Fitzgerald.

Accompanied by Dr. Fitzgerald and Health Officer Ruggles, I have made a close inspection of the El Dorado School Building as regards its sanitary condition, its warming and ventilating system, lighting, etc.

The building seems well adapted to its requirements as to room and arrangement. The water closets and urinals are the most perfect system that could be possibly had, being free from all possible odor and so ventilated as to make it impossible that any air or odor from them can enter any

COMPETITION DESIGN
FOR STORES & FLATS
Martens & Coffey, Architects.



CALIFORNIA ARCHITECT & BUILDING NEWS
SAN FRANCISCO.

BRITON & REY, PHOTO LITH.

VOL. XX N° 6 JUNE, 1899.

PERSPECTIVE SKETCH
SALINAS HIGH SCHOOL

Louis J. Done Vent



CALIFORNIA ARCHITECT & BUILDING NEWS
SAN FRANCISCO

BRITTON & REY, PHOTO LITH

VOL XX N°6 JUNE 1899.

WILMERDING SCHOOL
OF INDUSTRIAL ARTS

Cor. of 17th & Utah Sts.

Curlitt & McCaw - Architects.

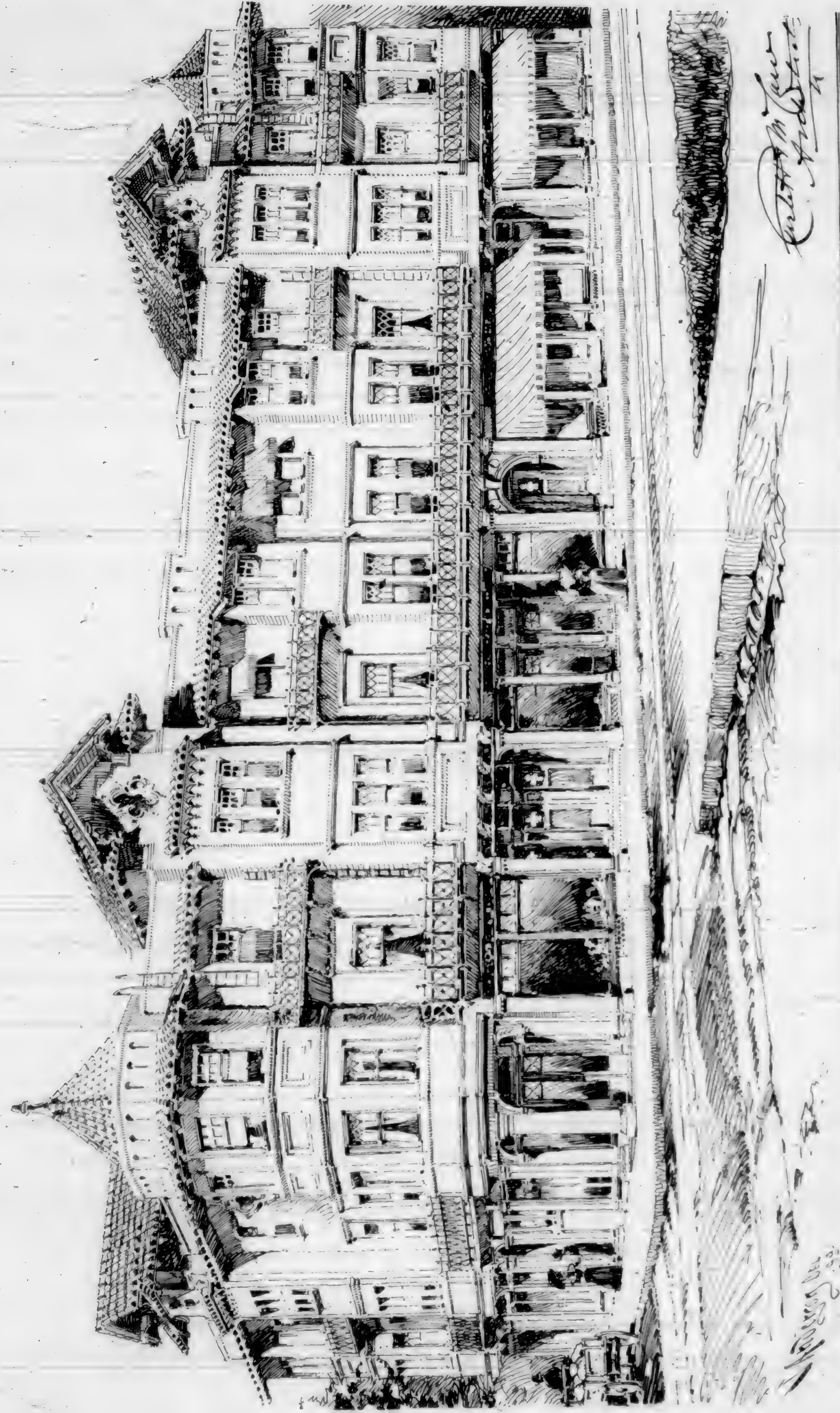


CALIFORNIA ARCHITECT & BUILDING NEWS
SAN FRANCISCO

BRITTON & REY, PHOTO LITH

VOL XX N°6 JUNE 1899

STORES & FLATS FOR
THE PHELAN ESTATE
(Cor. South Park and Third Street.)



other part of the building. The closets and urinals are arranged with automatic flushes that can be regulated to flush any number of times per hour desired.

The heating and ventilation are accomplished by a most perfect system, by which a large amount of fresh air is warmed but not overheated, and admitted into the rooms in such a manner as not to produce a draught, an amount of impure air equal in volume to the pure air admitted being withdrawn from the floor where the impure air is most apt to be found.

By the most careful tests we found that the entire air of the room was changed at least $7\frac{1}{2}$ times an hour, keeping the air fresh and pure and giving the room a fresh, spring-like feeling. A test for carbonic acid gas the most contaminating element to be found in crowded and poorly ventilated rooms, gave as a result an amount of said gas scarcely above that of the out door air, thus proving beyond a doubt that the system is a perfect success and that the children who at-

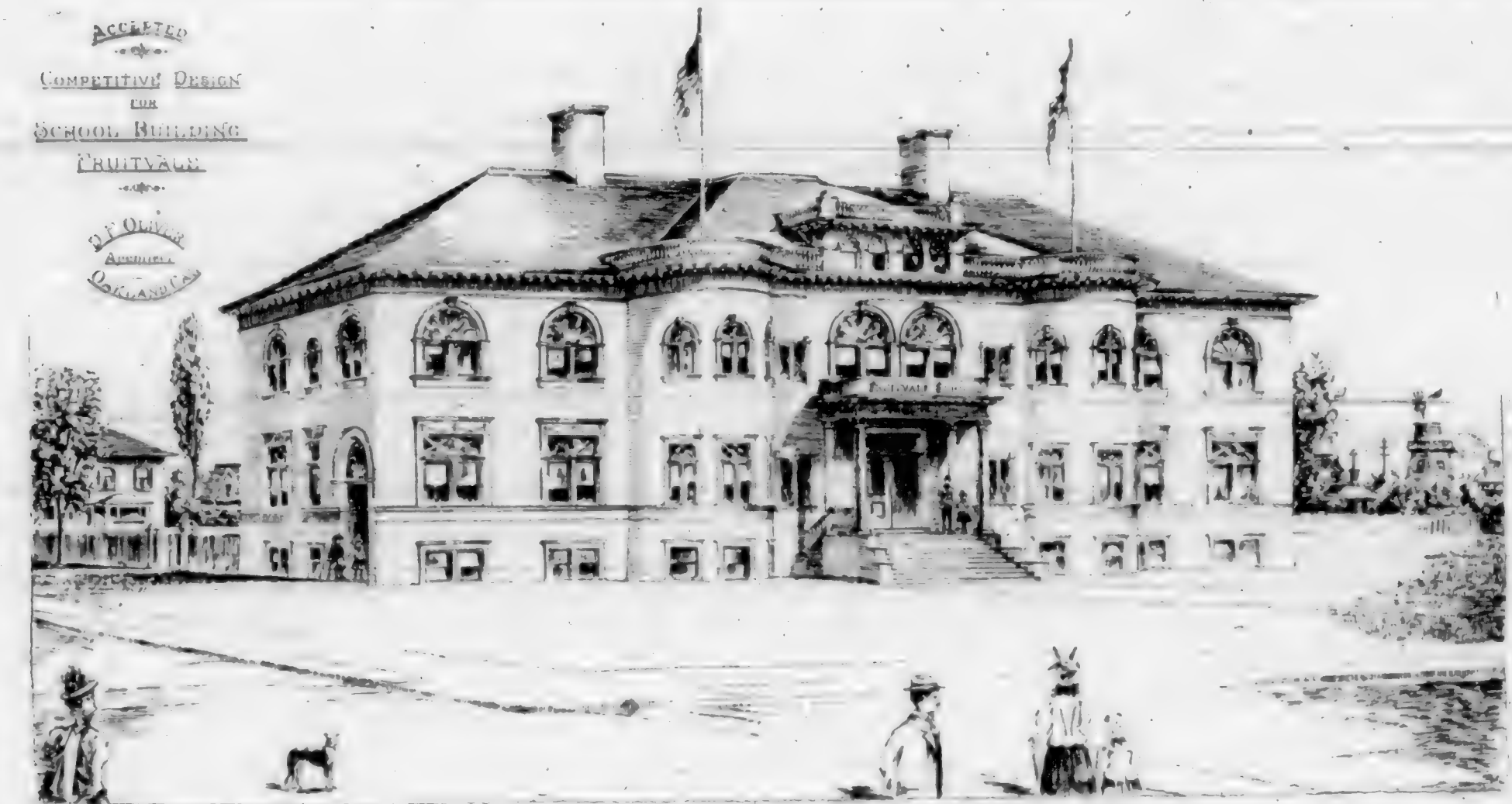
children are too warm, some too cold and all with cold feet and hot heads. To fully appreciate the condition of most of our schools and to understand what they should be, one should read a paper which I carefully prepared and read before the San Joaquin County Medical Society in March 1895, after having visited most of the school buildings in company of the School Board.

With due appreciation of its importance, this report is respectfully submitted.

(Signed) S. B. Davis, M. D.
Chairman Com. on Public Buildings of Board of Health.

We have carefully read the above report submitted by Mr. Davis, Chairman of the Committee on Public Buildings, and heartily endorse it and concur in all its suggestions and recommendations.

(Signed) William E. Gibbons, M. D.; W. W. Fitzgerald, M. D.; S. N. Cross, M. D.; C. A. Ruggles, M. D.

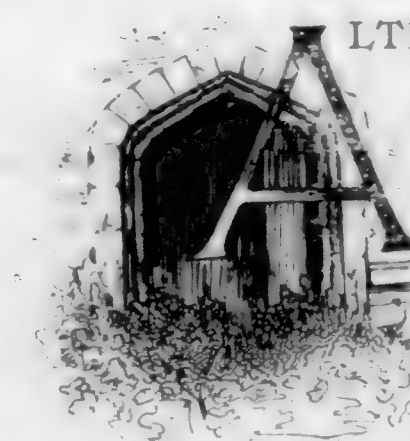


tend the El Dorado School have nothing to fear from a cold or vitiated atmosphere. Contagious disease in such a school if once introduced, would not have the tendency to spread, as in those without these very excellent sanitary advantages. The children would average better scholars and brighter students and make better citizens, when grown to manhood or womanhood, than will those attending schools unprovided with equal sanitary appliances.

During the past school year Drs. Ruggles, Fitzgerald and myself have visited many of the school buildings of this City to investigate and if possible suggest improvements in their sanitary condition.

We found in most buildings, the heating and ventilating were about as imperfect as possible. Many of the rooms crowded with from 40 to 55 children are warmed with stoves and have no means of ventilation provided, excepting such as is most likely to remove the warm air and admit the cold air in such a manner as to give draughts affecting the children within the immediate vicinity. Thus some of the

THE ACOUSTIC PROPERTIES OF BRICK AND TERRA COTTA.

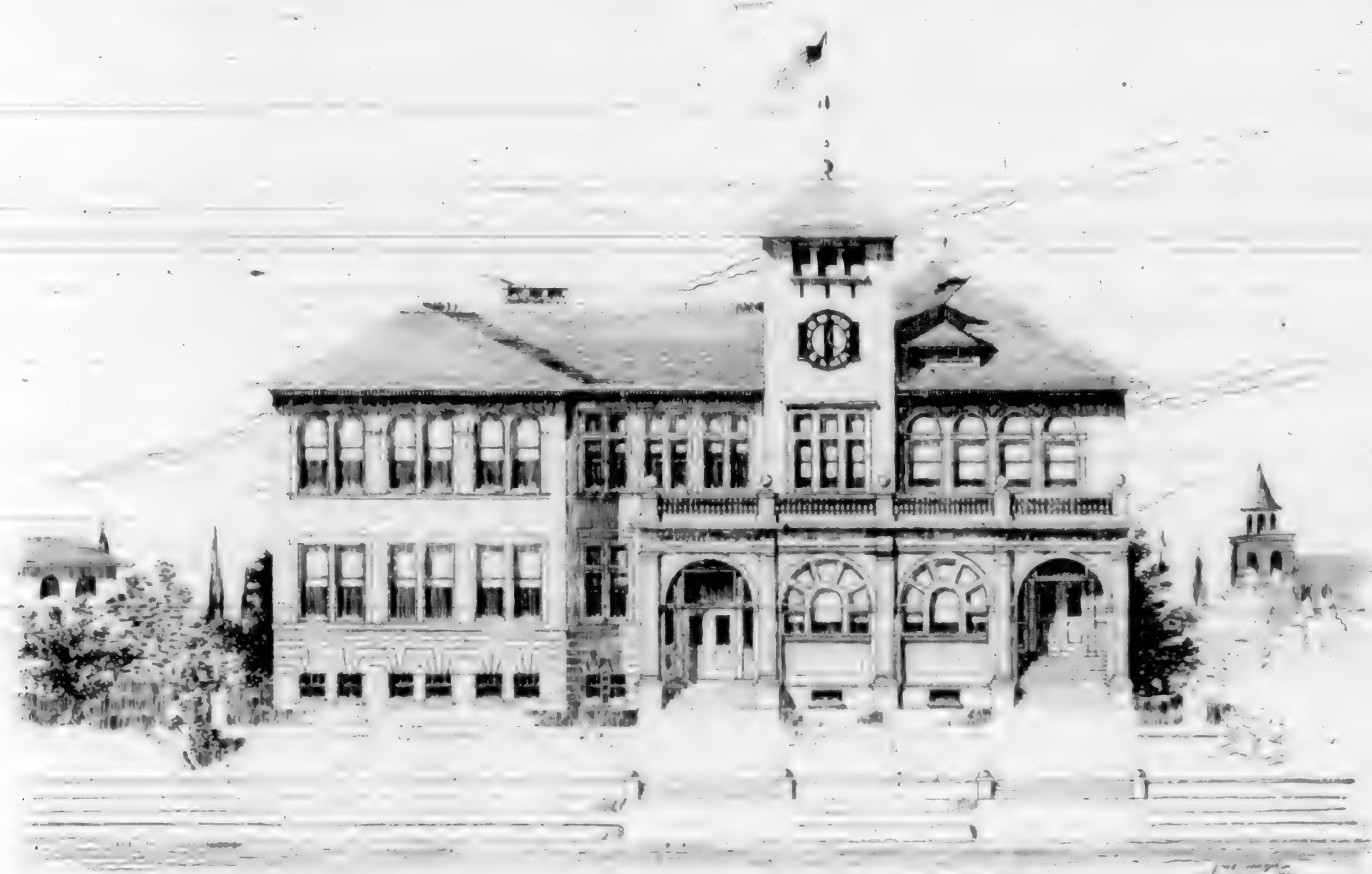


ALTHOUGH a great deal is known concerning the acoustic properties of wood, and of various metals used in construction, it is not a little remarkable that analogous properties in brick, tile, faience and terra cotta should be so little understood. This ignorance arises in great measure from the circumstance that both physicists and architects have contented themselves hitherto by considering acoustics from the point of view of the shape of interiors of buildings only. Or, in a secondary way, the materials lining the walls, and such as may be regarded as capable of reinforcing sound,

have received some attention. As a matter of fact, in many large buildings such things as resonant boards, reflectors, and match-board dados are quite subservient to the chief materials of construction as often laid bare in the walls of the higher part of the building inside. Again, we commonly find that at least some considerable part of the walls is lined with clay goods in some shape, such as tiles, glazed panels, and the like.

Everybody who has studied the acoustics of large buildings admits that the chief enemy to deal with is reflection of sound, which produces echoes and general uncertainty in hearing, no matter whether the lecturer be strong or weak in voice. Consequently we find that when, the building having been newly put up, the acoustic properties are bad, the first thing the architect flies to is that which he understands best, namely wood. During the present century

utilized for the performance of music, we commonly find that attempts are made to lessen it by using drapery. An interior, designed by the architect to show off its noble proportions, or enriched by the frescoes of some Royal Academician, or embellished by beautiful marble panelling and mouldings, is thus ruined. For the right interpretation and appreciation of orchestral music it is absolutely essential to stifle echo at its birth. We should hear only that which proceeds direct from the executants to our ears, and the harmony should not be disturbed by the reverberation of the musical notes from side to side of the building. It is to be noted that intensity of the sound is not the leading factor in such a case as this. If a little water be violently thrown on to the surface of a smooth-faced wall it glances off, and the same thing will happen with a large quantity; on the other hand, if either the large or the small quantity be



HIGH SCHOOL AND LIBRARY—SAN RAFAEL, CAL.

there has been quite a boom in that material, though we ought not to forget the metal reflector placed over the pulpit in St. Paul's Cathedral, which has been so successful in that particular case.

Yet, but a little consideration of some elementary problem in physics suffices to show that wood is by no means always desirable, or can be in any way successful, in the interior of many edifices. Wood is a great reinforcer of sound by reason of its elasticity, but that very property is disastrous in certain interiors.

Sound is most perfectly reflected from smooth surfaces, and when acoustics of the interior are bad owing to form of construction, and reflection is wanted, what could be better than glazed surfaces? Large glazed tiles, or faience work in panels, are most admirably adapted for the purpose, but how often do architects use them for their acoustic properties. On the other hand, when owing to interior shape of the building reflection from the walls is not wanted, where can any better material than porous clay-goods be found? When echo is too manifest, and the building is largely

thrown on to a wall having a porous surface much in either case will soak in. And so it is with sound. If the grand interior which we have just been alluding to were constructed of porous clay-goods, the architect, the Royal Academician, and the embellisher still have their chance, and the drapery could be done without.

We do not ask modern artists, with all their fanatic and æsthetic ideas, to succumb to science or to pander to the worker in clay, but we are perfectly justified in reminding them that many of the ancient works of art which they all but worship are the work of clayworkers. They seem to forget this. Their ideas are confined (like the latest craze in art) in straight lines and angles; they have set up for themselves a certain number of cast-iron regulators, which may be likened unto the by-laws of a county Council. They can see art in ancient clay-work, but not in modern—that is because they have moulded themselves into that train of thought. Once get rid of that, and we can furnish both the artist and the architect with materials such as the ancients had in the interior of their buildings, which were then, and

are now, in many respects acoustically perfect, which were then, and are now (in ancient structures) admired for their artistic beauty.

We have said that clay work is often superior to wood work for acoustic purposes; we will substantiate that point by referring more particularly to the merits and defects of both for the uses named. Let us begin with wood. Here we have a material with a fibre; we cannot get wood without fibre. Fibres act as wires and are conductors of sound like the latter. Consequently if sound strikes a match-board surface, much of it is immediately given a biased direction in the direction of the fibres. This bias is useful when the wood is to act as a species of sounding-board, but when echoes are to be minimized (as is more frequently the case) it is to be deprecated. Wood with knots is better as retarding the propagation of sound within the fibres, than is wood with straight fibres.

But for sound-proof walls, if wood is to be employed, it has to be cut in such a way as to make the general construction somewhat expensive. Now all this can be done away with if such a material as terra-cotta be employed. The velocity of sound in a body is a fair index of the use of that body for acoustic purposes. As would naturally be supposed, the velocity is not so great in loosely compacted materials as in those more closely aggregated. If the object in the wall be to stop sound from going through it, then it might be lined with exceedingly porous terra-cotta. If, on the other hand, the surface is to be of a neutral character, terra-cotta with a "semi-vitreous" face is more suitably employed. If, as in many small country churches, the upper parts of the wall above the dado are to be left bare, the bricks showing should always have a fairly hard surface so as not to soak in the sound too much. But, for a church having a central dome, underneath the centre of which the pulpit is to be usually placed, the interior of the dome if left bare (commonly the case with small churches) should be made of strong rubbers, and we should not object to the light porous kieselguhr brick for such a purpose.

It may be taken for granted that the velocity of sound is greatest in hard brick, such as ruabon-reds, metalline, hard blues, firebrick, and stocks, and least in gaults, ordinary reds, and sand rubbers. To recapitulate, therefore, the former class should be employed for conducting and reinforcing sound, and the latter for the reverse—as sound-proof materials, and in stifling echoes.

Majolica and faience, when used in broad and flat surfaces, must increase echo, and when used very thin must be fairly resonant; when much broken up, however, either by frequent jointing, or when projecting in pattern, sunk or raised, its effects must be mainly of a neutral character.

The problem of the obnoxious party wall may be readily solved by using soft brick jointed with good mortar, taking that the wall is solid throughout; the difficulty of noise in flats from one floor to the other might be very considerably done away with by using majolica and faience ceiling mouldings for all angles, and by constructing the face of the wall of the porous brickwork, faced by plaster of a more or less porous character. Sound reflectors for public building, not for reinforcement of sound, but for giving it direction, would be more suitable when of porous earthenware, and this would be much less unsightly than metal reflectors and tubes.

In short, the capabilities of clay goods in the directions indicated for assisting and modifying sound, are much more worthy the attention of architects than has hitherto been

thought: less worthy materials have had a long trial, now give "brick, tile and terra cotta" a better chance.—*Clay Record.*



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.

WILMEDING SCHOOL of Industrial Arts, Corner of Seventeenth and Utah Streets. Curlett & McCaw, Architects.

STORES and flats for the Phelan Estate corner South Park and Third street, Curlett & McCaw, Architects.

COMPETITION Design for frame business block, Martens & Coffee Architects.

PERSPECTIVE View, Salinas High School, L. P. Stone, Architect.

VALUABLE INFORMATION CULLED FROM OUR EXCHANGES.

THE results of some experiments to ascertain the most effective material for checking the percolation of water through brick or stonework are given by Mr. A. W. Hale in a recent number of the Engineering and Mining Journal. The investigation was mainly carried out in connection with the new Croton aqueduct of New York, and the substances employed in the experiments were numerous and varied. It was found that Portland cement gave the best results, and that the hydro-carbons, which are commonly regarded as suitable materials for rendering brick or stone impervious to water, oxidized by exposure to air and gradually disappeared. It was also found that a brick was rendered im-

pervious to water by cement more rapidly when the cement was applied as a wash by means of a brush than when applied with a trowel in the usual manner. A brick which had been treated with four cement washes was found at the expiration of two months to be quite impervious to water, even under a pressure of two hundred pounds per square inch.

IF Andrew Carnegie has mastered the art of making money, he has been equally conspicuous in a discreet but munificent manner of giving it away. In the course of the last twenty-five years he is credited with giving away \$17,000,000 for public purposes. He is evidently a robust believer in educating the people, and in the forces for good that are the dynamics of intelligence. His benefactions to libraries have been ungrudging and wide-spread. Among nineteen of these the iron king has distributed not less than \$5,483,000, ranging from \$8000 to \$3,000,000. These are big figures, and are but a portion of what has really been a massive benefaction to human good. Nor has the water all gone over the dam.—*The Age of Steel.*

A FARM of three hundred and fifty acres is being worked by electric power in the state of New York. There are two waterfalls on the farm, and these furnish the power for operating the electric plant. One motor, of ten horse-power, operates a hay cutting machine, another a threshing machine, and another a circular saw for cutting logs. The dwelling house is well lighted and is also heated by electricity. Cooking is done by electricity and churns, milk separators and other dairy appliances are operated by the same agency. The power is also used for lighting barns and other buildings. As more power is generated than is necessary, the surplus is rented to two knitting factories. This is claimed to be one of the most complete and unique installations ever yet made on a farm, and its success will probably lead to others of its kind, with like facilities of water power being on equal terms.—*The Age of Steel.*

AT a meeting of the Franklin Institute long since past Prof. Edward J. Houston speaks of the physiological effects of alternating currents of high frequency. He divides electric discharges into three varieties. First, galvanic currents; second, alternating current, commonly called faradic; and third, electro static discharges which may be called Franklinic currents. It seems as though Franklinic and faradic currents produce about the same effect upon the muscles. Another fact is equally true that as the rapidity of alternation increases, the severity of the physiological effects decreases until when enormously high frequencies are reached, the discharges become harmless. These facts have been demonstrated by Dr. Tatum for comparatively high frequencies and by Nikola Tesla for enormously high frequencies. To quote from Tesla, we conclude with the following: "I have found that by using the ordinary low frequencies the physiological effects of the current required to maintain at a certain degree of brightness a tube four feet long provided at the ends with outside and inside condenser coatings is so powerful that I think it might produce serious injuries to those not accustomed to such shocks; whereas with 20,000 alternations per second the tube may be maintained at the same degree of brightness without any effect being felt."—*The Electrical Age.*

NOTICE OF MEETINGS.

SAN FRANCISCO CHAPTER, AMERICAN INSTITUTE OF ARCHITECTS, meets second Friday of each month at 408 California street, at 4 p. m.

SETH BABSON, Pres.
J. W. REID, Sec.

H. A. SCHULTZ, Vice-Pres.
JOHN M. CURTIS, Treas.

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

A. B. BENTON, Pres.
JOHN P. KREMPET, Sec't.

ARTHUR B. BENTON, Vice-Pres.
AUGUST WACKERBARTH, Treas.

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

WM. E. BOONE, Pres.
CHARLES W. SAUNDERS, Sec.

JAS. G. HILL, Vice-Pres.
W. J. MARSH, Treas.

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

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

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

GEO. W. PERCY, Pres.
OTTO VON GELDERN, Sec.

W. F. C. HASSON, Vice-Pres.
EDWARD T. SCHILD, Treas.

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

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

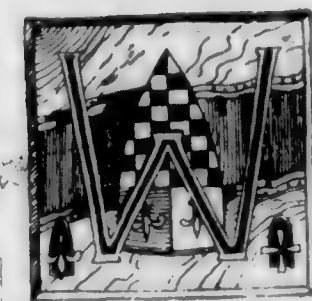
BUILDERS' EXCHANGE, Directors meet first Friday in each month at Mission and New Montgomery.

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

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

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

THE STATES AGAINST THE TRUSTS.



WHILE it is unfortunate, it was inevitable, that the anti-trust agitation should develop a difference of views as to where the proper power is lodged for the suppression of the trusts. The dual character of our government affords a basis for honest differences on this point, especially as to many of the suggested methods of heroic procedure against the evil. Hence it happens that we find the opinion of the Attorney-General of the United States opposed to that of Justice Harlan, of the United States Supreme Court, on the general proposition that the Federal Government is competent to deal with the trusts. The Attorney-General holds, in effect, that domestic corporations must be controlled by the States; while in his dissent from the opinion of the Supreme Court in the Sugar Trust case, Justice Harlan expressed himself in this wise:

"We have before us the case of a combination which absolutely controls, or may, at its discretion, control, the price of all the refined sugar in this country. Suppose another combination, organized for private gain and to control prices, should obtain possession of all the large flour mills in the United States; another of all the grain elevators; another of all the oil territory; another of all the salt-producing regions; another of all the cotton mills, and another of all the great establishments for slaughtering animals and the preparation of meats. What power is competent to protect the people of the United States against such dangers except a national power—one that is capable of exerting its sovereign authority throughout every part of the territory and over all the people of the nation?"

It is not to be denied, to be sure, that Congress may not in a variety of ways hamper and discourage the trust movement—as, for instance, by the enactment of a law placing all foreign merchandise competitive with trust products on the free list; but as against congressional power of extirpation by taxation, or by means quite as drastic and even more direct, constitutional questions are interposed in number.

Inasmuch as delay favors the trusts; gives strength to their commercial and financial standing, and opportunity and encouragement for their further formation—it is evident that if the evil is to be checked before it has run its full course, the States must attack it upon their own account, without reference to anything the Federal Government may or may not do in the fulness of time.

This is the Texas view of the situation, and it is a sensible and business-like one. Governor Sayres of that State has determined, according to newspaper reports, to call a conference of the Governors and Attorney-Generals of the Southern and Western States for the purpose of "discussing and agreeing upon a concerted and effective policy and line of legislation against trusts and monopolies." This conference will recommend to the Legislature of the several States represented in it such measure as will, if enacted, insure uniform and effective laws for trust suppression.

There is no doubt that if such a programme as this is followed by fifteen or twenty, or more, of the Southern and Western States the subjugation of the trusts will be assured. But can such concert of action be had? Still, the plan is a good one, even if it cannot be carried out—and it is certainly worth the trying.—*The Age of Steel.*

TALKING ALONG A RAY OF LIGHT.

IT SEEMS very much like a fairy tale to hear of a public exhibition being given showing how human intelligence can be transmitted along a beam of light. At the Electrical Exhibition, on Saturday afternoon, May 13th, the radiophone was shown in operation. This is an instrument of such construction that by means of a search light beam, speech can be transmitted a distance of seventy-five yards and heard with distinct enunciation. The property of selenium makes it immediately susceptible to the influence of light so that if used in conjunction with some variable light producing apparatus a telephone in circuit with it will give issuance to sounds in perfect harmony with these optical changes. A system of this kind can truly be called wireless telephony thus giving prominence to this latest exposition as the first in the world's history in which telegraphing and telephoning was carried on without a visible intervening medium between the transmitter and receiver. We remember in the fables of the Arabian Nights of the magic eye piece by means of which one of the characters delineated there was able to see the actions and motions of his friends though miles away from them. We have practically reached that state of ideal development, for at this present hour it is possible to send sketches over the wire through a distance of hundreds of miles, to send speech and signals through the ethereal atmosphere without employing the familiar means hitherto in use. Tesla's idea of transmitting power in vast quantities without wires at a distance far above the upper strata of clouds is one which may receive considerable attention in the near future. Within the last fifty years Americans have begun to invent and apply the forces of nature for many utilitarian purposes. If progress keeps up at the rate indicated there is much truth in the statement "that the marvels of the times have not yet appeared" for it seems very likely that many of our fondest delusions will

be shattered by scientific successes which may strike out from Funk & Wagnall's dictionary the word "impossible." The radiophone represents an old principle through a new construction, but selenium, the metal utilized, seems to be permanently associated with all experiments that lead us to hope that images and speech will some day be transmitted commercially without wires. In our efforts to reach a higher efficiency in mechanical and commercial operations we are not over-reaching ourselves in directing investigations along such a channel of inquiry. The wireless telegraph system has come to stay. Why not wireless telephony?—*The Electrical Age.*

NOTE.

IT PLEASES us to notice the return to this city of Mr. M. S. James, agent of the J. L. Mott Iron Works, whose office in San Francisco is in the Flood Building. This firm has agencies in all the large cities of the United States, and furnishes the latest improvements in plumbing to builders throughout the country. Mr. James is a genial gentleman, and all around, up-to-date man. Call on him.

NEW YORK SURPRISED HIM.

A YOUNG Frenchman, wealthy, educated, and of an investigating turn of mind, departed for home a few days ago, taking with him some remarkable impressions of New York. He spent two weeks in this city, and, having some excellent letters of introduction, he met many persons well qualified to show him the sights of the American metropolis. Although an experienced traveler in European lands, this young Frenchman had never before been in the United States, and he frankly admitted that objects were presented to his view here such as he never saw before. Being impressionable, he naturally fell a victim to the irrepressible New York practical joker.

The tall office buildings astonished this visitor, and after luncheon one day on the thirty-sixth floor (as he believed) of one of them, he readily swallowed the yarn that vegetables and poultry were raised on the roof, because it would cost too much to get them at the markets.

While riding up Broadway with a waggish friend a few days before he went home, he noticed for the first time a slender thread of steam curling up from a manhole. "What is that?" he asked.

"Oh, that is one of the vents of the public radiator," was the reply.

"Public radiator," exclaimed the Frenchman. "You don't mean to tell that the streets here are heated by steam?"

"Certainly, in cold weather," was the unblushing answer. "Don't you feel warm and comfortable?"

"Indeed, I do," responded the Frenchman, enthusiastically. "But I never heard of such a thing as heating the streets of a great city. Well, well, New York certainly does beat the world."—*Heating and Ventilating.*

HYDRAULIC MORTAR.

CEMENT and mortar tests have been so extensively made and discussed that the subject may seem almost exhausted, but the value of such tests depends so much upon the manner in which they are conducted and investigated that a study as scientific as that made by M. Feret, the head of the laboratory of the Ponts et Chaussees at Boulogne, and published in the Bulletin de la Societe d'Encouragement demands recognition.

M. Feret first describes and tabulates the extensive series of tests for resistance to tension, compression, piercing, and shearing which were made in the laboratory under his charge, the same Portland cement being used in all cases, in connection with various kinds of natural and artificial sands, the intention being to investigate rather the physical properties of various mixtures than the comparative merits of different cements. The results are given in tabular form, and also plotted in curves, showing graphically the general behavior of the materials, after which the effect of variations in a series of test samples is discussed.

Attention is called to the fact that widely different results may be obtained from the same material, according to the manner in which the tests are made, and emphasis is strongly laid upon the point that tests are not comparable unless they have been made in the same manner.

In tests for flexure, for instance, the size of the specimen of great importance, since the distance of the outer and

more resistant portion from the neutral axis has a great influence upon the result, and in general the greatest resistance of any specimen is found in that portion nearest the exterior. An unequal distribution of stresses must, therefore, appear in tension tests as well as in those for flexure, and this equality is still greater when the mixture is not perfectly homogeneous.

According to the theory of resistance of materials, tests by flexure and by tension should lead to the same ultimate strength, but deductions based upon materials of supposedly perfect elasticity do not hold good for mortars, especially as the point of rupture is approached. M. Durand-Claye has shown that the resistance deduced from flexure tests is almost double that obtained from direct tension, and the tests of M. Feret bear out the fact that there is a definite ratio between the two resistances—namely, the resistance by flexure is to that by tension as 1.89 to 1, or, in round numbers, as 2 to 1.

Similar relations were deduced between the resistance to compression and to shearing and punching, a constant and proportional ratio being found. There does not appear, however, to be any such proportionality existing between the results obtained by tension and by compression tests, and two different mortars having the same resistance under compression may show very different results in tension. As a result of much experience deduced from many tests, M. Feret states that he believes the test by compression gives the real measure of the coherence of a mortar more nearly than does a tension test. In all cases the compression tests gave more uniform and consistent results, both for large and small specimens and for various conditions of homogeneity.

The most important part of M. Feret's paper, however, is that relating to the physical constitution of a hydraulic mortar, especially with regard to the size of ultimate particles of the materials employed, and to the thoroughness of the admixture.

For a fine sand the resistance to crushing is much greater than for a coarse sand, the proportion of sand to cement being the same in both cases. A tabulated series of tests, using a constant quantity of cement and sand, but with different proportions of fine and coarse sand, showed that the resistance to compression was two and one-half times greater with fine sand than with coarse, and corresponding variations appeared with the other mixtures.

An approximate measure of the nature of a mortar in this respect may be obtained by determining the density, or, as M. Feret calls it, the "compactness," of the mixture, since this bears a relation to the proportion of voids between the particles, which doubtless plays an important part in the strength of the mortar. In plotting the results of the tests made with sands of various degrees of fineness, M. Feret uses the ingenious form of triangular pyramid adopted by Professor Thurston in his investigation of the strength of various bronzes, and in this manner the results are shown with a clearness not otherwise possible. Similar diagrams are given for mixtures of sand, cement and pulverized slag, and the paper closes with data as to the effect of the addition of a proportion of puzzolana to cement and sand, especially for hydraulic mortars which are to be exposed to the action of sea-water.—*Clay Record.*

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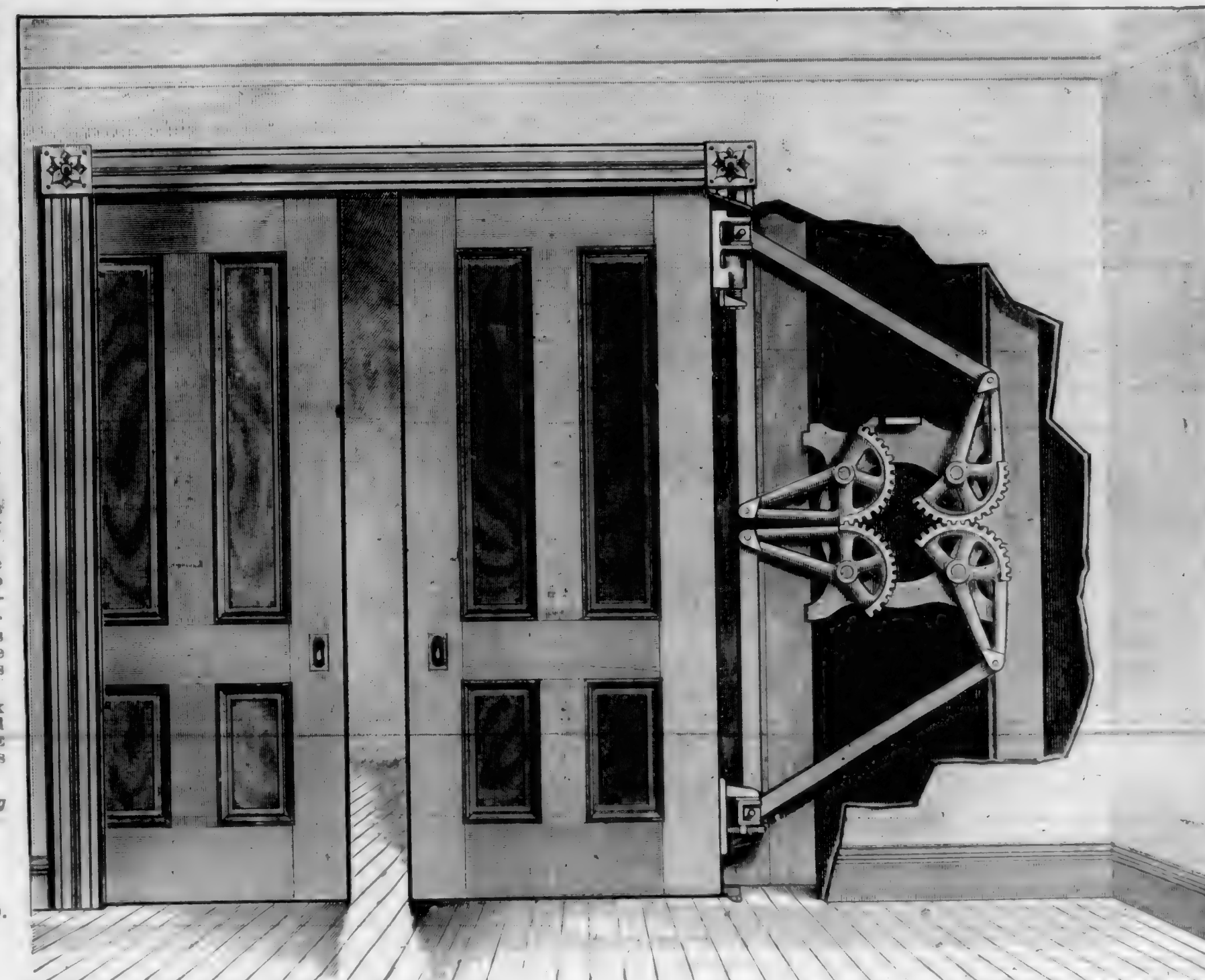
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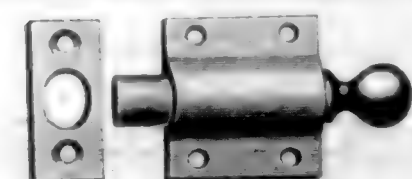
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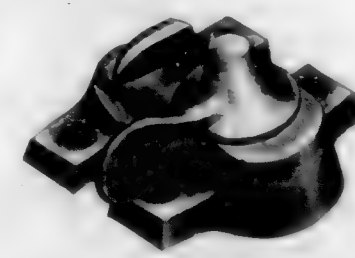
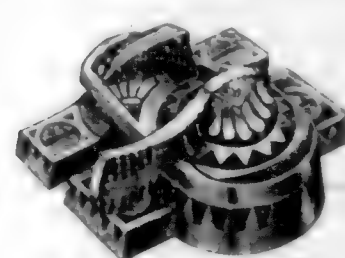


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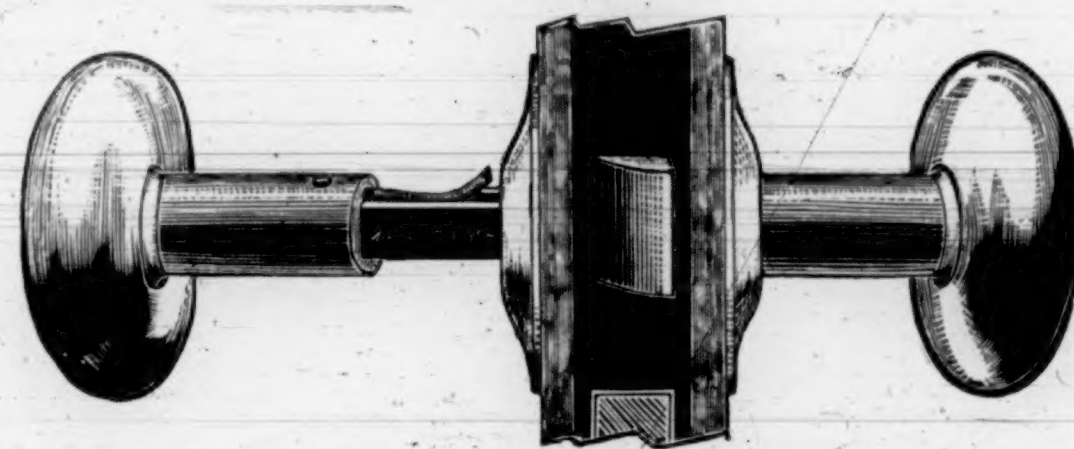
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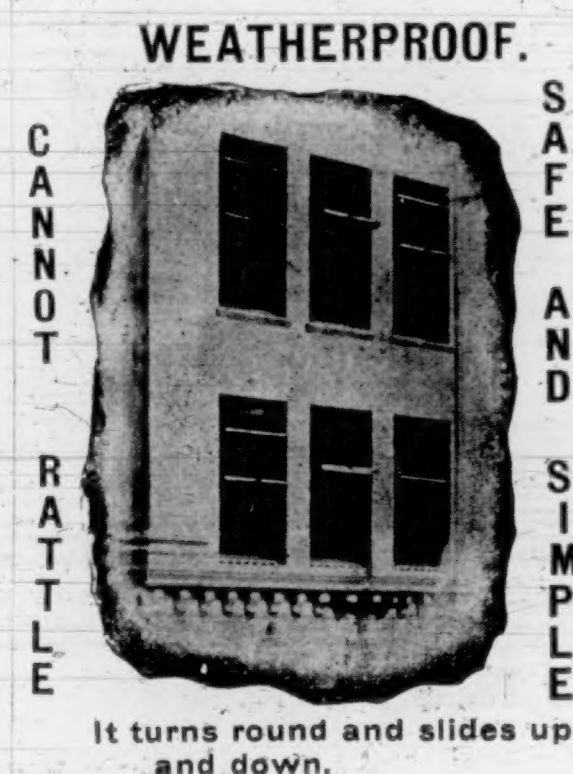
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BUILDING NEWS.

Vallejo near Webster. To build; o. Mrs. Jessie T. Boyce; a. A. Nordin; c. C. Koenig; cost \$3394.

Van Ness near Green. To build; o. Chas. Heinz; a. C. A. Meussdorff; c. H. T. Greib; signed, May 29; filed, June 2, cost \$4750. Plumbing, etc.; c. W. J. J. Weekes; cost \$900.

Van Ness Ave. and Jackson. Additions and alterations; o. M. Heller; a. J. Kraft; cost \$1789.

Washington and Laguna. Wiring for electric light; o. W. G. Irwin; a. Reid Bros; c. Cal. electric works; signed, June 8; filed, June 19; cost \$1241. Carpentry; c. Hansbrough & Roberts; cost \$4296. Tin and galvanized iron work; cost \$1419. Plumbing etc; c. W. F. Wilson; cost \$6139.

Washington near Devisadero. To build; o. Jeanette Clabrough; a. C. A. Meussdorff; c. Masters & Cremer; cost \$6195.

ALAMEDA

San Antonio near Willow. To build; o. A. Merle; c. F. Bamman; cost \$2250.

BERKELEY

Channing Way near Telegraph Ave. To build; o. John W. Richards; a. F. A. Mathews; signed, June 5; filed, June 6; cost \$5267.

Vine and Arch. To build; o. B. M. Newcomb; a. Cunningham Bros; c. W. T. Veitch & Bros; signed, May 29; filed, June 2; cost \$8105.

OAKLAND

Additions to dwelling; o. J. L. Fogg; a. S. Babson; c. Anderson & Stockholm.

Telegraph Ave. and 30th. To build; o. Pauline Sande; a. Chas. Mau; c. J. H. Dingwell; cost \$3594.

PALO ALTO

Stanford University. Carpenter work, etc; o. Mrs. Jane Stanford; a. H. A. Schulze; c. R. P. Hurburt; signed, May 16; filed, May 31; cost \$32,000. Grading, etc; c. Geo. Goodman; cost \$20,645. Sand stone, etc; c. McElvray Stone Co; cost \$79,879.

SAN LEANDRO

Block 31. To build; o. R. C. Archbishop of S. F.; a. C. J. I. Devlin; c. Phil. Sheridan; cost \$3537.

SAN RAFAEL

Fourth and B. Two-story brick; o. Mr. McNear; a. Chas. Paff; c. Rodd & Rodd; cost \$8450.

STOCKTON

West Popular. Cottage; owner, Frank Goodell; architects, Beasley & Son; contractor, C. M. Long; cost \$1860.

Foundation for Stockton "Vail" Building; W. W. Oates architect; brick and stone work by Doyle & Son, contractors; balance of work by R. Powell, contractor, cost \$28,000.

Residence for H. Williamson, corner of Sutter and Oak streets; Geo. Rushforth, architect; H. W. Murray contractor; cost \$4800.

West Acacia near Fikorapo. Residence; Franklin Davis owner; Geo. Rushforth, architect; C. M. Long, contractor; cost \$3157.

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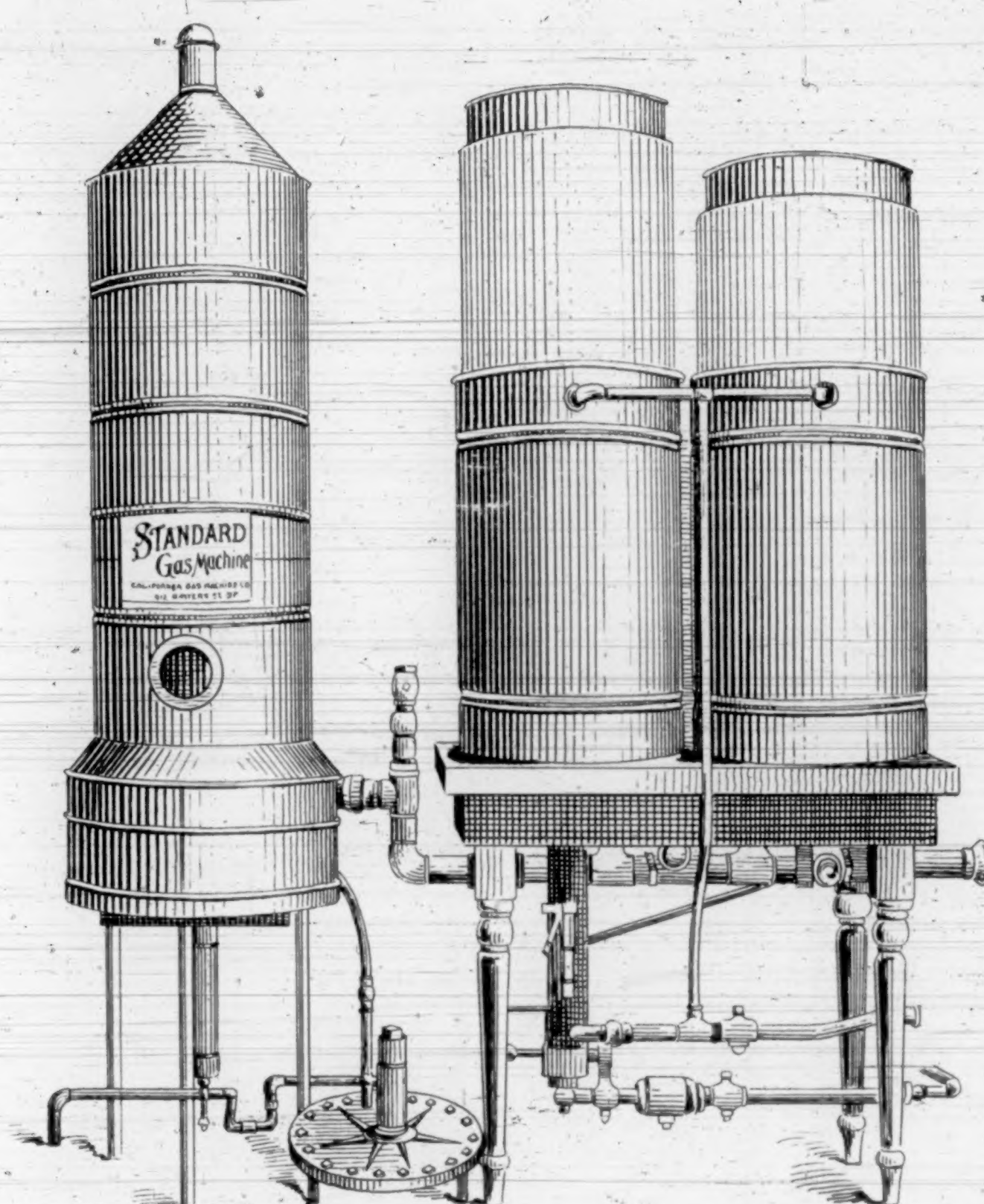
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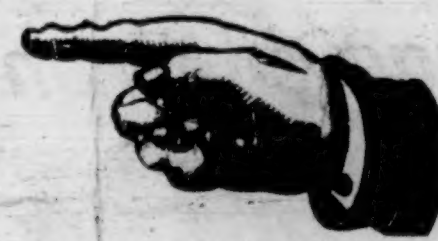
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