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THIS new office structure, adjoining the Counselman Building, which is next to the Board of Trade, has been built at great expense and in the most thorough and substantial manner, with the sole object of making it a superior office building, and perfect in all its appointments. In this, the owner and architect have admirably succeeded, as an inspection of these well arranged and elegant offices will demonstrate. W. D. Kerfoot & Co., of 90 Washington street, who are the agents of the building, occupying, as they do, the leading position among the real-estate men of Chicago, have taken the utmost care to make the offices of the utmost attraction to the tenants and valuable to the owner; and, as in the thousands of large enterprises this firm have engaged in, in the past fifteen years, their efforts have been successful.

The front is of the fine Anderson pressed brick, both plain and ornamental. The basement story, main entrance and trimmings throughout are of Fox Island granite, furnished by the Hallowell and Bodwell Granite Co., whose work in granite has, through the Western manager, Mr. George F. Bodwell, been placed in almost every large building where granite is used.

The mason work is such as to give not only the appearance of solidity, but is of a character to make this one of the most substantial buildings yet erected, though the mason contractors, George Lehman & Son's Co., are noted for this class of work.

The plumbing is on the best system known, with water in all the principal rooms, with ample provision in the line of sanitary conveniences, and was placed, together with the plumbing, by Fosskett & Brown, whose work in several buildings of like importance has been unusually well executed, and satisfactory to the owners.

An elegant automatic letter chute, connecting with the United States mail box in the basement, is connected with each floor, and is a "new departure" in office building conveniences, highly indorsed by the postoffice officials. Like the elevator, it is a necessity, and like them adds to the comfort of tenants, and is as indispensable.

Ample fireproof vault accommodations are provided throughout the building for all tenants, placed by the Hall's Safe and Lock Company, giving additional security, the quality of this firm's make insuring perfect immunity from danger from fire and burglars.

Two of the celebrated Crane Bros's hydraulic elevators have been placed in this building. They have a safe-lifting capacity that can possibly be placed in them, the subject of elevators having been carefully considered, the adoption of these giving to the building swift, safe, and convenient elevator service. The painting and finishing has been executed by J. B. Sullivan and Bro., and their taste and the substantial quality of their work is noticeable throughout the interior.

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CHICAGO POST OFFICE,
Office of Superintendent of City Delivery,

January 2nd, 1885.

CUTLER MANUFACTURING Co., Rochester, N. Y.,

Gentlemen:—I have watched the operation of your Patent Mailing System as now in use in the Calumet Building in this City, with some care, and I am glad to say in reply to your inquiry that I consider it an improvement of great value not only to the public but to the Carrier service. The collections from the Calumet system average 1,500 pieces per day, which would be not less than 270,000 pieces since we commenced to collect from it. You are at liberty to use this letter in any way that you think will tend to make the system better known, as it certainly deserves to be.

Respectfully,

W. D. RAWLINS, Sup't.

ADDRESS THE

CUTLER MANUFACTURING Co.,

ROCHESTER, N. Y., Sole Makers.

The Practical Quality of Granite.

AN article appeared in the March number of the *North-Western Improvement Record* comparing the crushing strength of different granites, but it is hardly calculated to give that information needed by architects and builders, from the fact that a comparison of the crushing strength of granites does not enter into a practical solution of the best qualities of granite as a building material, for the reason that every kind of granite yet tested has a crushing strength, superior to nearly all other building stones and far superior to brick masonry. Trautwine gives the following crushing strength of different materials per square foot, averaged:

Rubble masonry, 25 tons; cement, 112 tons; Caen stone, 135 tons; Connecticut sand stones, 200 tons; lime stones and marbles, 625 tons; granite, 750 tons.

Consider for a moment that a tower of granite would have to be built over eight thousand feet high (according to Trautwine) to crush itself. When we consider our office buildings, ten stories high, of brick masonry, an essay on the crushing strength of granites appears, practically speaking, is unnecessary.

The practical questions to be asked in regard to granite, the quarries and the owners are in regard to its color, composition, freedom from iron, black knots, waves, blemishes, seams and other defects, ability to furnish large quantities of stone in a short time, development of quarries, facilities for working the material, experience, number of buildings already erected from the granite and how it has proved itself, and the responsibility of the company operating the stone. These are practical tests. The New England granites are now being used to a large extent in Chicago, the following buildings being wholly or partially built from it: Cook County buildings, New Board of Trade building, Chas. Counselman's office building, Home Insurance building, Gaff building, Pullman Palace Car Company's new building, one of the finest in this city. New Open Board, Royal Insurance Company's building, Adams Express building, Mallers' building, and many others. The granite for all but two of these was furnished by the Hollowell and Bodwell Granite Company, who own and operate several quarries in the East of different qualities in composition, also different in color, seven of the granites being used in the grand stairways of the New Board of Trade building, and are all polished. The great extent of the quarries, their development, facilities for making the same and experience has been the cause of the use of so much of this stone in this section, and it is expected that more fine buildings will be built from this material; notably the thirteen-story office building for Marshall Field, by Architect S. S. Beman, all showing a practical exposition of the extent and purpose to which granite can be used, rather than a theoretical computation upon its crushing strength.

A Wood Mantel Exhibit.

THE fashion introduced in the West several years ago of constructing mantels of wood with the beveled plate glass ornamentation during the previous decorative epoch used almost exclusively in sideboards, etc., soon grew into a "rage," and the result was looked for with considerable apprehension by those who were enthusiastic in the renewal of carved wood mantels. And justly so, for the fashion soon led the cheap furniture manufacturers into the business, and the result was the introduction of work of uncreditable design and cheap material and workmanship. But it is observable that through the refusal of architects to recognize the unartistic and pernicious invasion upon the artistic decoration of the homes of the people has been broken up, and the competition now encourages the best work artists can devise or the best wood carvers execute, show rooms for the display of mantels and the accompanying necessity, grates, have been fitted up, and it is noticeable that the best manufacturers are apt to have the most advantageously located and attractive show rooms. A recent visit to the show rooms recently fitted up by the C. J. L. Meyer & Sons Co., of Chicago, emphasized this fact. Attached to their immense exhibits of interior wood work of all descriptions, adjoining a room which displays doors, casings, etc., in every description of wood, showing the resources of the house for interior trimmings, and upon the second floor, reached by a richly carpeted stairway from the grate and tile department, a wonderfully complete exhibit in itself is the show room for wood mantels and grates. This room, containing over 2,000 square feet of floor space, is richly carpeted, and the walls frescoed to form a fitting background for the work so richly displayed. A few can only be described, for there is a style to suit every taste and none to offend any. A white and gold mantel with brass grate framed in blue tile and a plate glass mirror occupies a prominent place, and corresponding to it, with an elegantly designed and corniced hall mirror, is one of ebony, plate glass and gold. A plain yet rich mantel in dark mahogany is noticed. This will attract few but the truly artistic, but these will see in its rich plainness a beauty surpassing many more elaborate and striking. A grate in hammered iron attracts attention through its artistic quality. A sleeping Time, with head bowed and wings folded, resting upon the star hiding clouds, is seen, dim yet distinct, in the iron work above the grate. On the sides are rushing waves and the fish flying through them, drawn out by the artist with the same unobtrusive clearness, a marvel in iron and a fit accompaniment to the old mahogany carvings in the mantel above. It is a good sign for those who have the artistic progress of the West at heart to see the honest strides the wood workers' art is making, and that the work of the artist in mantels will be such as will live to be copied and leave its impress upon the arts of the present when the changing fashion will look for something to take its place and find nothing better.

CONTRACTORS ON OPERA HOUSE AND OFFICE BUILDING.

The Opera House Office Building.

THIS building is owned by a stock company, but the success of its erection, under the plans of the architects, Messrs. Cobb & Frost, is largely due to the practical ability and activity of the agents, W. D. Kerfoot & Co., in whose hands the interior arrangement has been arranged so as to give the greatest convenience to tenants, and the result has been the renting of almost the entire number of offices at a good rate to first-class tenants. The structure is a beautiful example of Chicago Anderson pressed brick, and the interior of the entire building illustrates the perfection to which the art of fireproofing has been brought by the Pioneer Fireproof Construction Company. Their capacity for the manufacture and setting of every description of hollow, solid and porous tile for fireproofing buildings has been exemplified in this structure, as the floors, ceilings, roof and the partitions are all of this material, placed in the most thorough and perfect manner. The plumbing and gas-fitting contract is one of the most important on the building, and as the closets are numerous on each floor to give perfect convenience to the tenants, the execution must of necessity be in thoroughly reliable hands. This is secured by this contract being performed by E. Baggot, who, as one of the oldest in the line in the city, has always retained the confidence of architects and owners.

Elevators.

ARCHITECTS do not consider their education complete without a thorough mastering of the different improvements that go into the modern structure. The elevator is more than an improvement, at least the Hale elevator is, for it is largely owing to this wonderful piece of human ingenuity and power that high buildings have not only been made possible, but popular.

The buildings made for habitation in the past were made two or three stories in height, because there were no elevators. Five stories were considered almost beyond reason, and the value of the floors decreased as the distance from the ground increased; but the elevator system has changed all this, and today the four large Hale hydraulic elevators that have been placed in the new Opera House Buildings make the tenth floor as convenient of access as the first floor, with the decided advantage of being above the impure air and darkness of the lower floors. The old foggy idea of fear that still existed in some minds has been thoroughly removed by the smooth running, carefully constructed elevators that are an adjunct of all our principal office buildings, and when it is noticed that they nearly all bear the plate of Hale hydraulic elevator it is not surprising that their make was selected for the Opera House.

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St. Louis pressed..... 27 00

Purinton Kimbell "Standard"..... 26 00

Indiana pressed..... 16 00@ 28 00

Philadelphia pressed..... 4 00@ 45 00

Milwaukee pressed..... 25 00

Trenton..... 38 00

Zanesville (Harris Bros.)..... 33 00

Perth Amboy Buff..... 50 00

" " Mottled..... 50 00

Moulded:

Chicago (Anderson).....\$65 00@ 300 00

St. Louis.....50 00@ 125 00

Indiana.....25 00@ 50 00

Zanesville (Harris Bros.)..... 75 00

Enameled:

Enameled edge..... 90 00

Enameled edge and end..... 105 00

Enameled (Harris Bros.)..... 90 00

CEMENT, LIME, ETC.

Per Cask.

Chicago Lime.....\$ 0 65@ 75

Wisconsin..... 96@ 1 00

Milwaukee, Utica, Louisville, Akron..... 1 00@ 1 25

Portland..... 3 25@ 3 50

Keene's coarse..... 7 50@ 9 00

Keene's fine..... 11 00@ 12 50

Plaster of Paris..... 1 75@ 2 00

Hair (cattle), per bu..... 20@ 25

Hair (goat), per bu..... 40

Sand (lake shore), per yard..... 1 00@ 1 25

STONE.

(Quotations furnished by J. S. F. Batchen.)

Limestone..... Per cubic foot.

Buff Bedford.....\$ 50

Blue Bedford..... 65

Hoosier blue Bedford..... 65

" " buff..... 50

Joliet..... 35@ 50

Lemont..... 40@ 50

New York bluestone..... 1 35@ 1 40

Foundation:

Dimension..... 20@ 25

Rubble, per cord..... 8 00

Sidewalk..... 40@ 1 00

Planed..... 40@ 1 00

Sandstone:

Hummelstown Brown Stone..... * 1 50

Brown Connecticut..... 1 50

Amherst..... 60@ 75

Berea..... 55@ 65

Brown Potomac..... 1 25

Carbondell..... 1 10

Malone Blue..... 55@ 65

Marble:

Italian, veined..... 4 00

Tennessee, red..... 2 50@ 5 00

Tennessee, Knoxville..... 3 00

Marble, continued:

Vermont, white..... 3 50@ 8 00

Ophite..... 4 50@ 5 00

Armudite..... 1 50

Slate:

Roofing, Vermont, per square:

Green..... 6 50

Purple..... 6 50

Red..... 13 50

Black, Lehigh..... 5 75@ 6 75

Black, Chapman's..... 7 30@ 8 00

Black, Bangor..... 5 50@ 5 80

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Boards: (Ordinary Dimensions.)

Pine, 1st quality, clear.....\$44 00@ 48 00

Pine, 2d quality..... 44 00@ 46 00

Pine, 3d quality..... 40 00

Common..... 12 00

Siding:

Pine..... 9 00@ 21 00

Framing Timber:

Pine..... 10 00@ 14 00

Laths:

Pine..... 1 90

Shingles:

Pine (sawed)..... 2 00@ 2 60

Miscellaneous:

Pickets, pine..... 8@ 21

Posts, cedar..... 9 00@ 21 00

Pine, yellow southern..... 30 00@ 35 00

HARDWOODS.

(Quotations furnished by The Holbrook Co.)

Walnut, 1st & 2d, 1 in.....\$ 75 00@ 80 00

Walnut, 1 1/2 and up..... 80 00@ 100 00

Walnut, countertop..... 15@ 20

Ash, 1st & 2d, 1 in..... 32 00@ 35 00

Maple, 1st & 2d, 1 in..... 35 00@ 40 00

Maple, 1 1/2 & up..... 35 00@ 40 00

Oak, white, 1st & 2d, 1 in..... 30 00@ 35 00

Oak, 1 1/2 & up..... 35 00@ 40 00

Oak, red, 1st & 2d, 1 in..... 30 00@ 35 00

Oak, 1 1/2 & up..... 30 00@ 35 00

Oak, quarter sawed..... 40 00@ 50 00

Cherry, 1st & 2d, 1 in..... 80 00@ 85 00

1 1/2, 1 1/2 & 2 in..... 95 00@ 100 00

2 1/2, 3 & 4 in..... 25 00@ 30 00

Beech, red, 1st & 2d..... 28 00@ 32 00

Whitewood, 1st & 2d, 1, 1 1/2, 1 1/2 & 2 in..... 35 00@ 40 00

2 1/2, 3 & 4 in..... 35 00@ 40 00

Birch, red, 1st & 2d..... 35 00@ 40 00

Butternut, 1st & 2d, 1 in..... 50 00@ 55 00

1 1/2 & up..... 55 00@ 60 00

Sycamore, 1st & 2d..... 20 00@ 25 00

Gum, red, 1st & 2d, 1 in..... 25 00@ 30 00

1 1/2 & up..... 35 00@ 40 00

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Mahogany, Mexican, per lb..... 15@ 20

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Rosewood, per lb..... 5@ 15

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(Quotations furnished by Charles B. Crombie & Co.)

Redwood lumber.....\$60 00@ \$65 00

Redwood shingles—square, hexagon, round, diamond and octagon, small quantities..... 6 50@ 7 25

Mexican Spanish cedar..... 150 00@ 300 00

California pine..... 65 00@ 75 00

Georgia Yellow Pine:

Flooring:

1st & 2d clear, 4 in..... 35 00

1st & 2d clear, 6 in..... 35 00

Boards, D. 1 s..... 33 00@ 35 00

Beaded Ceiling:

1st & 2d clear, 1 1/2 in..... 18 00@ 21 00

5/8 in..... 26 00@ 30 00

3/4 in..... 33 00@ 36 00

Step plank:

1st & 2d clear 1 1/4, 1 1/2 & 2 in..... 33 00@ 35 00

Georgia Cypress:

Lumber, 1st & 2d clear..... 35 00@ 40 00

Shingles..... 3 75@ 4 25

Frame Oak Lumber and Timber:

Plank..... 23 00@ 25 00

Timber..... 24 00@ 30 00

PAINT, ETC.

Per lb.

White lead (American).....\$ 5 1/2

Zinc, white (American)..... 3 1/2

Red, Venetian..... 8@ 10@ 12

Red, Vermilion..... 2@ 6@ 12

Red, Indian (English)..... 20@ 30@ 40@ 1 00

Yellow, Ochre..... 12@ 22

Yellow, Chrome..... 2@ 15

Green, Chrome..... 12@ 20

Green, Paris..... 20@ 35

Black, lamp..... 8@ 30

Blue, ultramarine..... 16@ 35

Putty..... 3

Whiting (dry)..... 1@ 2

Paris white (English)..... 2@ 3

Litharge (American)..... 6@ 10

Sienna, burnt..... 9@ 16

Umber, burnt..... 7@ 16

Oil, linseed (raw), per gal..... 51

Oil, linseed (boiled), " "..... 54

Turpentine..... 34

Varnish, coach, " "..... 1 25@ 2 00

Varnish, shellac, " "..... 3 25@ 4 00

HARDWARE.

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Tennepenny, common..... 2 20

Shingle, 4's..... 2 05

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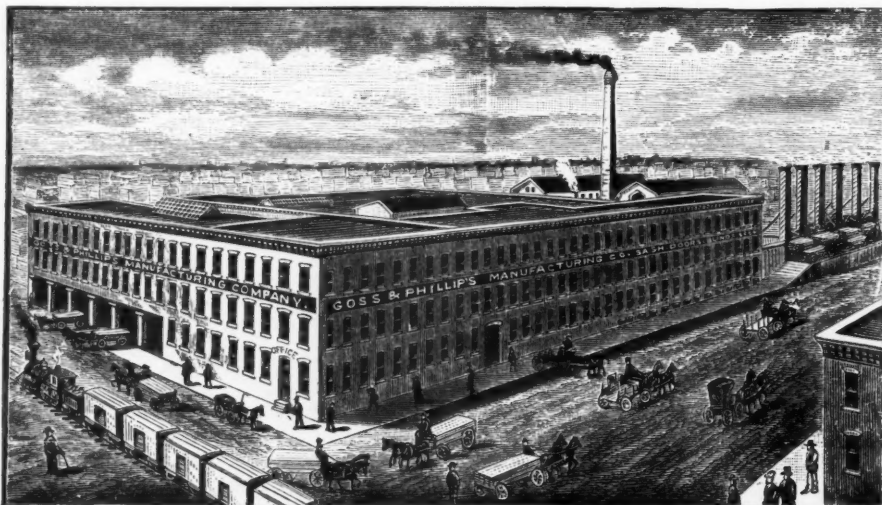
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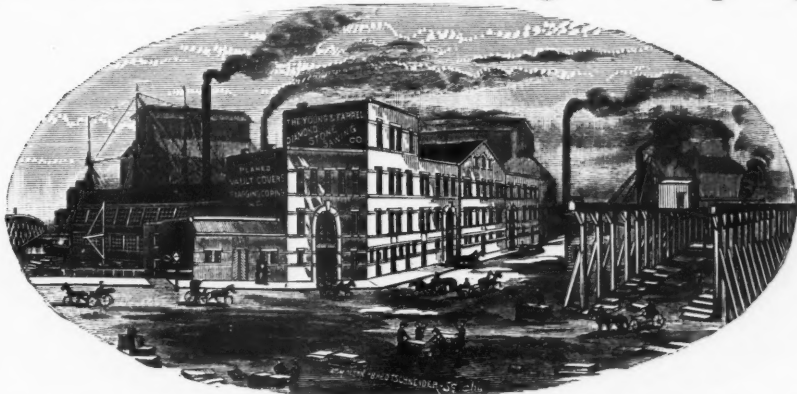
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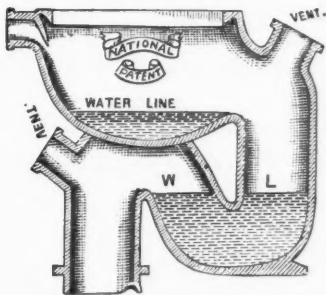
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Its advantages are: SIMPLICITY, CLEANLINESS, EFFICIENCY, CHEAPNESS, forming in itself a COMPLETE WATER-CLOSET BASIN and TRAP. It has no complicated metal working parts to FOUL or get OUT OF ORDER, hence its SIMPLICITY and CLEANLINESS are apparent. Its EFFICIENCY is proved by the fact that the DEMAND is continually INCREASING. Thousands are being sold annually and give the most COMPLETE SATISFACTION. Prices are MUCH LOWER than those of any other first-class closet claiming the same advantages. Where a FRONT OUTLET is preferred to a SIDE OUTLET a new closet, called the ALLIANCE, on the same principle as the NATIONAL can be substituted.

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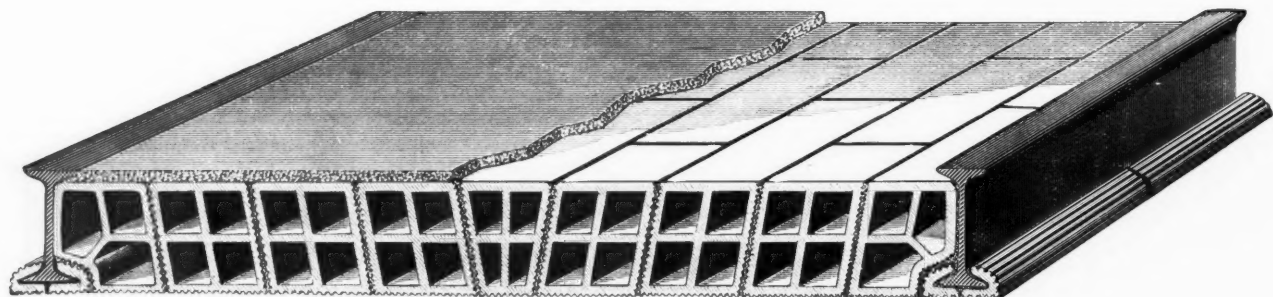
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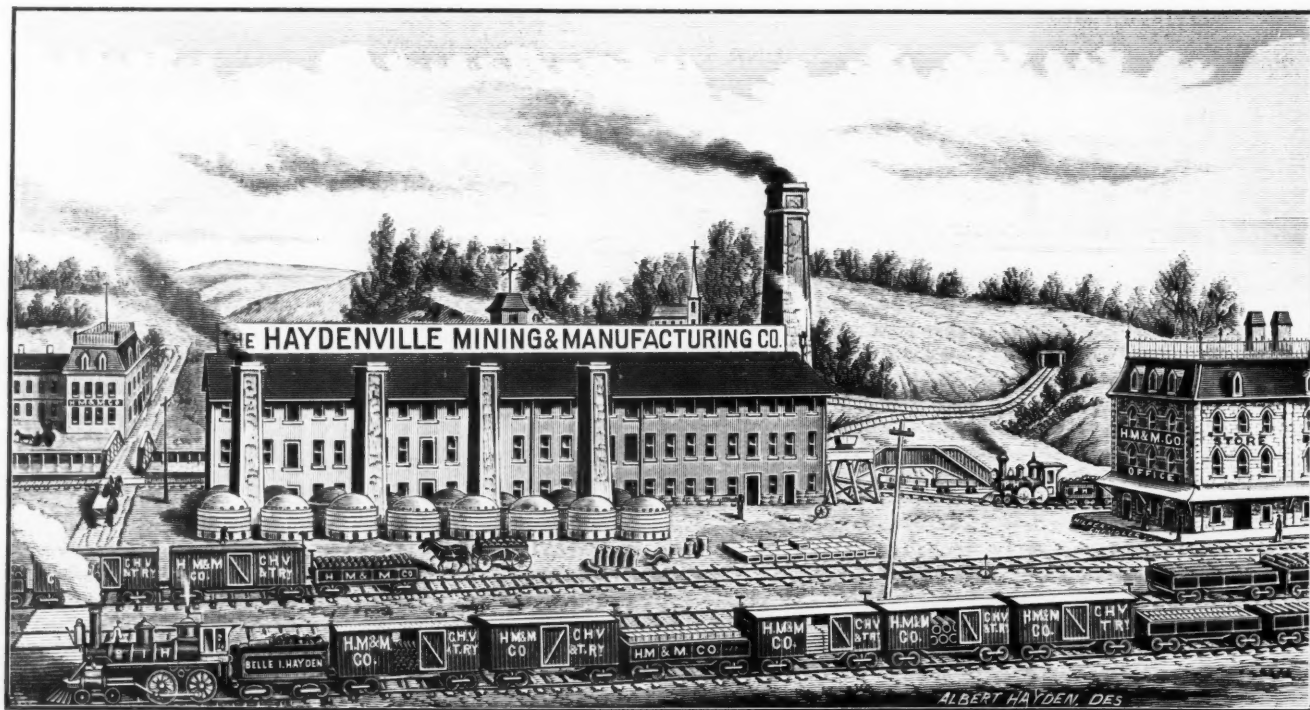
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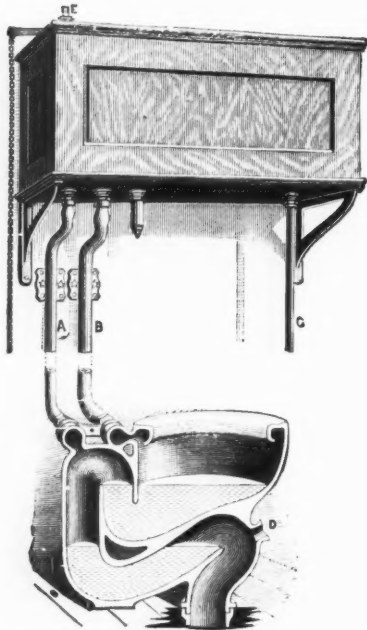
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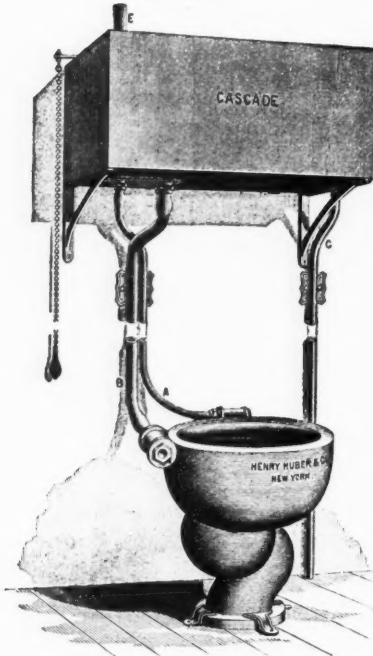
BOYLE'S PATENT SIPHON CLOSETS.

"TIDAL WAVE No. 1."



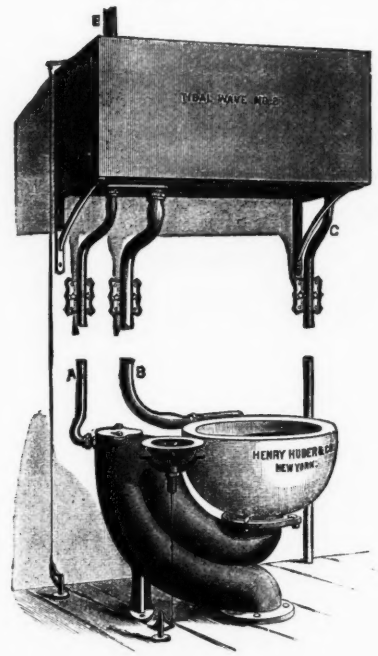
ALL EARTHENWARE.

"CASCADE."



ALL EARTHENWARE.

"TIDAL WAVE No. 2."



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In the selection of a water-closet, one that has an absolute water seal in the bowl should undoubtedly be given the preference, and there are none that possess this feature but BOYLE'S SIPHON CLOSETS. They are simple and positive in operation, which, based on a siphon action, clears the lower trap thoroughly with a limited supply of water, thus making this style of a water-closet the cleanliest for public and private use.

These closets are now in use all over the United States, and can be found in the most prominent buildings lately erected.

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The Wight Fireproofing Co.

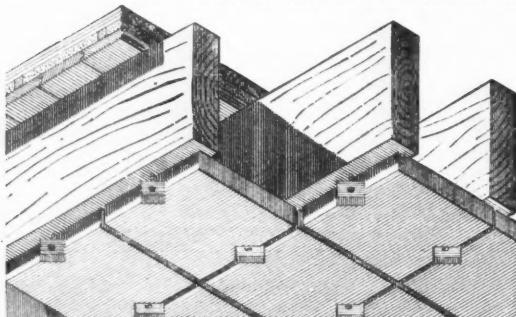
202 LA SALLE ST., CHICAGO. 60 WILLIAM ST., NEW YORK.

Contractors for all kinds of Fireproof Work in

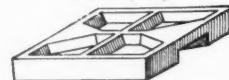
Hollow Fire-Clay Tiles and Porous Terra-Cotta,

IN ALL PARTS OF THE UNITED STATES.

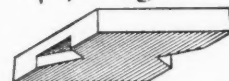
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Patented April 16, 1878, and
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Top of Ceiling Tile.



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500,000 feet of this Ceiling have been put up in Chicago, Milwaukee and Cleveland, and it is now being put in the American Bank Note Building, New York.

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In rolls 44 inches wide. Manufactured only by

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PROPOSALS.

NOTICE TO CONTRACTORS.

FOR

Steam Heating, Plumbing, Water-
Works and Tunnels.

Sealed proposals will be received at the office of the Governor of Indiana, between the hours of 10 and 11 o'clock A.M., *Saturday, May 30, 1885*, for the following classes of equipments for the Northern, Southern and Eastern Indiana Hospitals for Insane, located respectively at Logansport, Evansville and Richmond.

Class 1. For each hospital, 4 steam generators, 100 horse-power each.

Class 2. For each hospital, steam-heating apparatus, 15,000 to 22,000 square feet of radiating surface.

Class 3. For each hospital, sanitary fixtures and plumbing.

Class 4. For each hospital, pumping engines.

Class 5. For each hospital, water supply system.

Class 6. For the Northern Hospital, system of pipe tunnels.

Specifications (and drawings, where required,) of the above work may be seen at the office of E. H. Ketcham, architect, at Indianapolis, and additional information may be had of Dr. Jos. G. Rogers, Medical Engineer, at Logansport, on and after April 24, 1885. Separate bids will be required for each class of work, for each hospital, and each bid must be accompanied by a guaranty bond, with two or more resident freeholder sureties, in five per cent of the amount of the bid. The Board of Commissioners for the additional hospitals for insane reserves the right to reject any or all bids. Bidders on Class 1 will be required to furnish, with bids, complete and full specifications and drawings. All bids on any class of work must be accompanied by a full and complete itemized schedule of quantities and prices, the sum of which must equal the amount of the bid.

ISAAC P. GRAY,

Governor and Pres't Board of Commissioners.

NOTICE.

OFFICE BOARD OF TRUSTEES,
ARKANSAS STATE LUNATIC ASYLUM,
LITTLE ROCK, Ark., April 15, 1885.

Sealed proposals for the erection and completion of two wings to the Arkansas State Lunatic asylum will be received by the trustees of said asylum until Friday, May 15, 1885, at 10 A.M.

The plans and specifications for said buildings can be seen at the office of trustees, in room four, over Hall & Matthews, on the corner of Second and Main streets, Little Rock.

Each bid must be accompanied by a bond of thirty thousand dollars (\$30,000), subject to approval by trustees, for faithful compliance with the contract proposed.

The right to reject any and all bids is reserved by the trustees.

P. O. HOOPER,
J. G. FLETCHER,
R. K. WALKER,
T. C. TUPPER,
W. J. LITTLE,
Trustees.

NOTICE TO ARCHITECTS.

Notice is hereby given that the Board of Public Lands and Buildings for the State of Nebraska will receive at the office of the commissioner of public lands and buildings at Lincoln, Nebraska, plans and specifications until the 5th day of May, 1885, for a building for a hospital for the insane, to be erected within three miles of the city or town of Norfolk, Nebraska, as provided by an act entitled An act to establish a hospital for the insane, approved March 4, 1885.

The entire cost of said building including said plans and specifications, advertising and other expenses together with necessary steam heating apparatus, water supply and lights not to exceed the sum of seventy-five thousand dollars.

The Board reserves the right to reject any or all such plans and specifications, and will pay for such plans and specifications as may be accepted one and one-half per cent of the contract price of said building. Working plans and detail drawings must accompany and be a part of such plans and specifications.

By order of the Board of Public Lands and Buildings, this 2d day of April, 1885.

JOSEPH SCOTT,
Com'r Public Lands and Buildings.

J. K. RUSSELL.

ROBT. W. WEGG.

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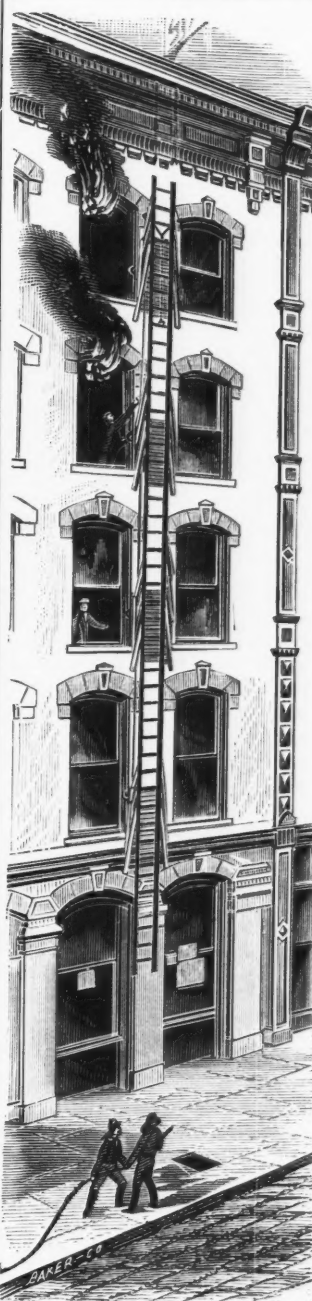
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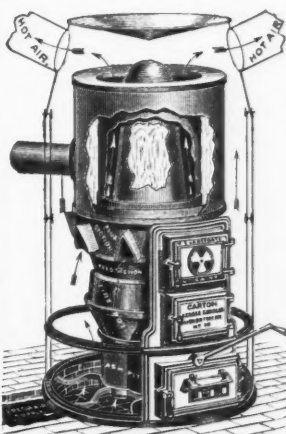
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New Double Cylinder Wrought-Iron Furnace.



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We solicit applications for our catalogue.

Agents wanted in every city.

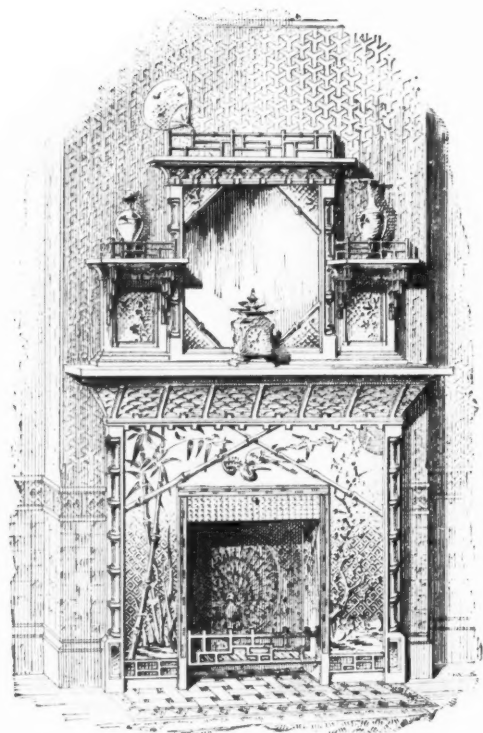
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HON. EDWARD CLARK, Architect of the Capitol at Washington, after a thorough investigation of various hand fire extinguishing appliances, recommended that *only* the "STAR" HAND GRENADES should be adopted for the protection of the valuable records in the file rooms of the National Capitol. Read this list of Government Buildings at Washington and elsewhere that have been equipped with "STAR" HAND GRENADES:

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Various other Public Buildings, Public Schools, Colleges, Court Houses, Penitentiaries, &c., as well as thousands of Factories, Stores, Homes, &c., from Maine to California, have been supplied with these Grenades.

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THEY PUT OUT FIRE INSTANTLY.

They act like magic. They cannot freeze. Are always ready. They don't deteriorate. They are cheap.



Any man, woman or child can use them effectively in time of need and they are perfectly harmless to flesh or clothing.

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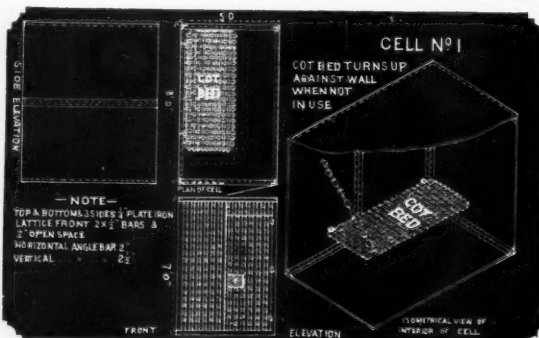
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GUARANTEED ROOFING PLATES.

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GILBERTSON'S "OLD METHOD."

MONROEVILLE, OHIO, Dec. 22, 1884.
After twenty-five years' experience running a tinshop, doing roofing work, etc., I am free to say I have never seen any Plates that equal the "GILBERTSON'S OLD METHOD" Plates, lately purchased of you.
It is all you claim for it, and on my own buildings I think I shall use no other, and shall try to have my customers let me use it for them, as I consider it economy to do so.

INDIANAPOLIS, IND., Oct. 22, 1884.
Your "OLD METHOD" Plate gives better satisfaction than any Re-dipped Tin I have ever worked.

GALLATIN, TENN., Aug. 21, 1884.
I congratulate you on your success. I think you have outstripped your competitors.

MARQUETTE, MICH., Nov. 21, 1884.
As regards the "GILBERTSON'S OLD METHOD" that we bought of you, would say that it is first-class, and works the same.

CARROLLTON, KY., Feb. 21, 1885.
MESSRS. MERCHANT & Co., Philadelphia, Pa.
Dear Sirs:—Your letter, making inquiry about "GILBERTSON'S OLD METHOD" Roofing Plate, received. I cheerfully recommend it as a first-class Plate, of even, well-coated sheets, square and tough, and I think it superior to "MF," and does not rust or corrode.
I have some that has been out all winter without paint, and it is now as good and bright as when laid.

(Signed) Yours truly, C.

WARTRACE, TENN., Feb. 24, 1885.
MESSRS. MERCHANT & Co., Philadelphia, Pa.
Dear Sirs:—In reply to yours of a few days since, in regard to your "GILBERTSON'S OLD METHOD" Terne Plates, would say that we find it to be one of the best Plates we have ever used.
It is well coated, works well in every respect. We put on a roof last October, and did not get to paint it until last month. There was not a particle of rust on it. We would prefer it to any Plate we ever used.
Anyone putting on a roof with that plate can guarantee it in every respect.

525 Arch St., 520 Cherry St.,
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MERCHANT & CO.,

Cliff and Beekman Streets,
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"CAMARET."

MINNEAPOLIS, MINN., Feb. 10, 1885.
We are very much pleased with the "CAMARET" Plates received of you. We consider the "CAMARET" as good as ———'s "Old Style," for which we have paid as high as \$15 per box.

LENOX, MASS., Feb. 25, 1885.
Considering the price, the "CAMARET" is the best Plate, by all odds, I have seen in an experience of 20 years.

CHILLICOTHE, OHIO, Feb. 24, 1885.
Our experience with "CAMARET" has been highly satisfactory.

TABOR, IOWA, Jan. 19, 1885.
I find the "CAMARET" the best Roofing Tin I ever used, and am more than satisfied with it.

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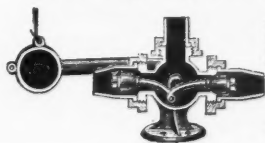
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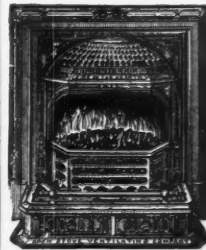
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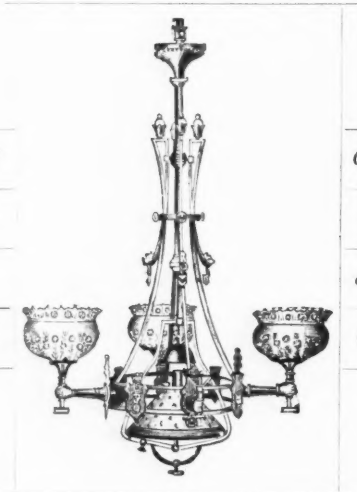
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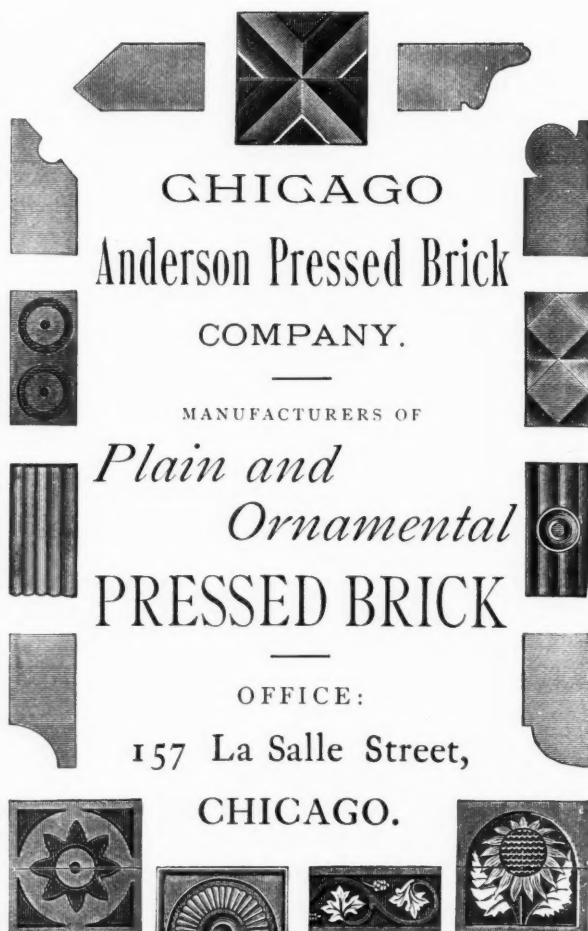
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THE INLAND ARCHITECT AND BUILDER.

Vol. V.

Extra Number.

APRIL, 1885.

THE INLAND ARCHITECT AND BUILDER

A Monthly Journal Devoted to

ARCHITECTURE,

Construction, Decoration and Furnishing

IN THE WEST.

OFFICIAL ORGAN OF THE WESTERN ASSOCIATION OF ARCHITECTS

(A NATIONAL ORGANIZATION.)

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L. MULLER, Jr., Manager. R. C. McLEAN, Managing Editor.
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THE INLAND ARCHITECT AND BUILDER has a larger number of subscribers in the West than any building journal in the country. Advertising rates are very reasonable, and will be made known on application. We take pleasure in directing attention to the high character of our advertisements.

Salutatory.

WITH this number of the INLAND ARCHITECT AND BUILDER its associate editor makes his first appearance in this capacity, and presents herewith his best bow. For some years past he has been an occasional contributor to the columns of professional journals when the *cacoethes scribendi* became irresistible; but it has always been with some apprehension, lest he might trespass too far on the courtesy of their managers. To be relieved of this embarrassment and placed in a position freely to address the constituency of this young, enterprising and already widely circulated journal, on matters of professional interest, without seeming to intrude, appears to him a privilege too tempting to be declined without a trial. While it is to be expected that the rawness of the "prentice hand" may occasionally appear, he hopes his initiatory efforts may not long surpass the patience of his readers, and anticipates forming in this way many agreeable acquaintances among the scholarly, artistic and yet practical men from whose genius and skill are being evolved the architectural glory of our common country. Ferguson considers architecture the noblest of human achievements, and Schiller (changing a word, but not the thought) adds:

"Seraphs share with thee
Knowledge; but Architecture, O Man, is thine alone."

AS a special edition the present number of THE INLAND ARCHITECT AND BUILDER is placed before many of those to whom it has heretofore been a stranger. It presents in general form those features that are the component attractions of the regular edition. As the representative of western architects and western architecture, and as the official organ of the Western Association of Architects and of state associations, this journal has reached a prominence extremely gratifying to its promoters. It is also a pleasure to note that architects of the highest reputation are showing their interest in the journal by furnishing perspectives and details of their best work for publication. The editorial department has just been strengthened by the accession of Architect C. E. Illsley, of St. Louis, President of the Western Association of Architects, as associate editor, giving to this department an additional scope and force. Attention is invited to the list of special contributors published in this issue, which numbers well known and able writers and authorities. THE INLAND ARCHITECT AND BUILDER was the pioneer in publishing with each issue a report of the building situation and of new buildings obtained by direct communication with the architects, and in this department it stands preëminent. Each department will be carried out in a way to make the journal of the utmost benefit to subscribers.

TO the architectural profession in the great West, the present is a time of peculiar encouragement from the continued progress of the movement toward organic unity which began in the Chicago convention, held less than six months ago. Up to that time every effort to unite the architects of this country into associations for the advancement of their profession, such as have long existed in England and in Europe, had entirely failed in the western states, and had but a very moderate success in the older communities on the Atlantic seaboard. So great had been the disappointment that it may be doubted if anyone of the originators of this movement had more than the faintest hope that the Chicago convention might be successful. For once faint hearts were cheered by a result exceeding their hopes; and it is noteworthy that the movement has since then displayed a most gratifying vitality. In Illinois, Iowa, Minnesota and Missouri, there now exist state associations of architects all formed or remodeled as the result of the Chicago convention, and the work is still progressing. The architects of Kansas City, returning full of enthusiasm from their convention in St. Louis, have immediately set about forming a city chapter under their state association. There is no reason to doubt their entire success.

IT is not enough, however, for architects to meet in convention, make each other's acquaintance for the first time, adopt a model constitution and by-laws, pay their dues, and return home all smiles and congratulations over the good time they have had and the good work they have done. This is well so far as it goes, but if it stop there, it might as well never have begun. Enthusiasm is ephemeral; it dies quickly even among architects, unless there is something permanent to keep it up. Measures must be devised and adopted to sustain the interest now awakened; it must not be allowed to cool off. Local branches should be organized wherever there are enough architects to form a club. Three or four are quite sufficient for an excellent beginning. These branches should

have regular meetings as often as feasible for conference, the reading of essays on professional topics, and discussions. Once well established, such local bodies will readily find matter enough to make their monthly (or more frequent) meetings interesting and profitable, and they will keep in effective order a system of organization through which any matter, requiring the immediate attention of all the architects of the state, can be placed before them without delay. Promptness and unity of action may thus be secured whenever necessary, and such necessity is likely to arise when least expected.

FOR some months the so-called Stockslager bill concerning the appointment and duties of the government supervising architect, and proposing to throw open to public competition among the architects of this country the design of all national buildings from this time onward, has been before congress. The author has courteously mailed copies of the bill to architects in various parts of the country for comment and suggestion before its final reading. It is safe to say that there has been no measure of greater interest to the architectural profession in this country ever proposed since the Declaration of Independence, or, not to limit the time too closely, since Columbus discovered America. Yet how little attention it has received! Apart from a few editorial remarks in one or two architectural journals, a chance letter from a correspondent and the comments of the Minnesota and Iowa state associations and of the Boston chapter of the American Institute, there is nothing to indicate that the architects of the United States care whether the bill of Mr. Stockslager becomes a law or not, or even know of its existence. This bill would have furnished excellent material for discussion by architectural societies in every part of the country, did such exist, enough to occupy several meetings in the most interesting and profitable way. Were our system of organization perfected, as it is hoped it will be in time, copies of this bill would have been sent to every body of architects in the country, through their state associations, as soon as it was read the first time, with a request for its discussion and a report thereon to the central body. In this way the attention of the whole profession could have been focused at once, and simultaneously upon this important measure, its views ascertained and its support brought to bear effectively in its favor. That would be considerable of a contrast with the present situation of the profession!

WHEN the mother of Achilles dipped him in the Styx to make him invulnerable, the heel by which she held him escaped immersion, and it was here the fatal arrow struck him. Some eight years ago the Singer Sewing Machine Company purchased a valuable lot of ground in St. Louis, and proceeded to erect a handsome and expensive office building, costing nearly \$400,000, with iron beams and hollow tile fireproof floors and partitions. The vulnerable heel of this fine edifice was its two-story mansard roof, which was largely of wood, and which, in farther inconsistency, appears to have been used as the lumber and rubbish room of the establishment. Here it was that a fire broke out recently, which was so well screened by the waterproof exterior of the roof and its height, as also by the net-work of telegraph and other wires around the building, that for a time the destruction of the whole seemed imminent. After great exertions and with favoring weather the fire was subdued, with no serious injury below the roof except from water. It is to be hoped that in repairing its building the Singer Company will take pains to make the roof fireproof as well as the lower floors, and it might be well to store the lumber and rubbish in some less dangerous locality.

SIMILAR to this Achilles-like building was the burning of the top story of the Stillman apartment house at Cleveland, Ohio, a few days ago. This was built two years ago at a cost of \$500,000. It was eight stories high and thoroughly fireproofed by the Pioneer Fireproof Construction Company's system *up to* the eighth story. The top story was a hooded mansard, 80 x 110 feet, and twenty-five feet to the roof, which was supported by wooden joists springing from cross walls. The sides were constructed with wood studding, boarded and slated, and the partitions were of studding with wood furring and lath. When the fire occurred, of course the destruction of this story was complete, but proved a magnificent test of the value of fireproof material, as the paper on the ceiling below was not in the least injured except where the iron girders, that were unprotected on the upper side, were bent by the fire and destroyed the tiling. The fire fell through pipe channels to the fifth story, setting fire to the wainscoting, showing the importance of cementing channels solid around pipes at each floor. The lesson these fires have taught the respective owners of the Singer building and the Stillman apartment house will not be lost upon them, probably, however it may affect the public generally.

WESTERN architecture has been brought before the people of the old as well as the new world during the past month through the completion of the new Chicago Board of Trade building, and the dedicatory exercises attending that event so important from an architectural as well as a commercial standpoint. The building which cost almost two millions of dollars is in its component parts and as an architectural whole, a monument to its architect, W. W. Boyington, and those who constructed it. The three fronts of the structure are of massive, gray granite from the Fox Island, Maine, quarries. The design is Gothic in conception, and with its nine stories of extraordinary height and a tower over three hundred feet high, it is an example of enduring strength and solid masonry such as the West has never before beheld. The success of its architect is nowhere more remarkable than in the fact that there is no solid rock to build upon, but that each foot of Chicago soil in the locality of this building covers a veritable quagmire, and he who builds wisely must carefully weigh each column and pier, knowing that an unequal balance will wreck his structure, especially if built as massively as this.

AND the erection of the Chicago Board of Trade building has served another architectural purpose. It has promoted the construction of great office buildings, and given to Chicago architects the opportunity for designing and erecting grand and elaborately conceived structures, the example of which will not allow of deterioration but will educate the public in the direction of permanent architecture, leaving ephemeral and hasty building a thing of the past and promoting, not only in this city but in all the large cities of the different states, a desire to construct for the future centuries as well as for present needs. Already has this become noticeable in neighboring cities, and though the architect may not be always equal to the conception, and, as in too many cases in the past, the massive building becomes a massive ruin almost before completion, because of the inexperience of the builders, the parsimony of those for whom it is erected or other causes, still the grand fact will remain and be year by year demonstrated that we have architects whose genius is equal to every demand, and like this grand pile that stands the center of western wealth and commerce, will not fall short of the needs of the hour.

Recent Progress in House Drainage and Plumbing.

BY WM. PAUL GERHARD, CIVIL ENGINEER.

AMONG the many practical and utilitarian details of interior construction tending to increase the comfort and convenient arrangement of houses, none occupy a more important position than those relating to the fixtures, traps and pipes which introduce and distribute into our buildings a supply of pure water for household use, and afterward remove from them the liquid and semi-fluid foul wastes, designated by the general term house sewage. Our modern homes present, in the vast number of pipes of all sizes, kinds and character which traverse them in all directions, not only across the basement or cellar, but also from cellar to garret, an appearance quite different from the houses built by our ancestors a century or more ago. A modern residence fairly abounds with pipes for the conveyance and distribution of illuminating gas into rooms and halls; with hot and cold water pipes; with pipes for heating purposes, carrying steam from boilers or returning to them condensed water; with channels or conduits carrying fresh air into the cellar, to the heating apparatus, or directly into living or sleeping rooms; with flues and registers for the admission of pure, warm air, ventilating flues for the removal of vitiated air, and chimneys for carrying off smoke from the combustion of fuel; with speaking tubes, telephone wires, tubes inclosing wires for electric bells and for electric lighting; and finally with waste and vent, soil and drain pipes for the removal of household wastes from plumbing appliances, which are scattered in all directions over the principal floors of the house.

These are what the tempting language of the advertisements of shrewd real estate agents or speculative builders comprise under the term "*modern improvements*," and the minds of American householders have been accustomed to the latter to such an extent that even small houses rarely remain without some of the above named comfort-promoting arrangements, and that a much higher price is willingly paid for the purchase or lease of a building well provided with them. Of course, with apparatus of all sorts and kinds in a house, requiring intelligent care and frequent inspection, but generally left to be manipulated by ordinary servants, and with the still prevalent custom of having much of the work concealed, partly or wholly, in walls, partitions, or between floor-beams, repairs are apt to be numerous, disagreeable and costly; and to avoid them, even in the early days of the introduction of such improvements, architects, builders and owners rarely failed to specify certain requirements, or neglected to make use of certain tests, to assure themselves that the pipes intended to convey water, steam, hot air, fire and smoke, and illuminating gas, were tightly jointed so as to prevent the unwelcome or unwholesome escape of any of their contents into the house.

But, with sewer pipes, soil and vent pipes, fixtures and traps, the usual practice has been different, the requirements in the majority of instances being less stringent, the danger arising from defective work being disregarded or overlooked through ignorance, indifference and folly, and the owner being less inclined to spend a sufficient amount of money for such work, except so far, perhaps, as the desire went to make a handsome display of richly decorated bowls, plated or gilt faucets, and elaborate ornamental woodwork, corresponding in style and elegance to the artistic decoration and interior finish of the rooms and the richly adorned outside of the building. It was idle, in those days, to attempt to speak to builders of a *sanitary* arrangement of plumbing work. Architects, consequently, paid the subject less attention than it rightfully demanded.

But the world moves, and, although progress in the art of properly draining houses seems to have been rather slow, yet in the last few years a decided change for the better has been noticeable. A stir was made in the interest of healthful homes and healthy living, largely by the dissemination of useful knowledge on the subject through newspapers, popular magazines, pamphlets and health reports. The indifference of the public gradually vanished, sanitary laws began to be better understood, the evil influence upon health of faulty plumbing work became apparent, a loud demand for healthful houses arose, sanitary surroundings were eagerly sought for, and the consequence was that architects, to meet the wishes of their clients, were obliged to give the subject some thought and attention. Builders, in their turn, were not slow to guard their pecuniary interest by, at least, a superficial endeavor to offer what the public demanded, and hereafter *sanitary* plumbing and *sanitary* heating became the leading features of many advertisements of speculative house-builders.

The greatest step forward, however, was made, when in our large cities plumbing work became subject to board of health rules and regulations. At first there was, as might have been expected, considerable ill-feeling against compulsory measures, especially against the intrusion of the ever-vigilant sanitary inspector into the interior of private houses. The sacredness of personal rights, as embraced in the old saying, "My house is my castle," was apparently violated. But a moment's consideration of the vast multitude of houses built as cheaply as possible, to sell or to rent as profitably as possible, will convince any one how necessary such inspection

must be. By way of digression, we would like to see a similar inspection enforced by law regarding the fireproof construction of buildings. Dwellings and apartment houses are frequently sold or rented as *fireproof*, when in reality they are little better than tinder-boxes, falling a quick and easy prey to the flames of a once started conflagration. The beneficial effect of plumbing laws extends principally to the vast number of householders and families in large cities, who are compelled to live in hired dwellings, apartments or tenements, and who cannot protect themselves against preventable sickness due to unsanitary surroundings, in particular to defective drainage.

The standard of plumbing work in such buildings, where all items of expense are apt to be reduced to a minimum, became appreciably improved and the condition of healthfulness increased, by giving its control to a board of health. Even if no other good results had followed the enforcement of rules and the official inspection of all work in new buildings, the single measure, compelling the owner of each new house to file plans and specifications clearly showing and describing the system of plumbing to be introduced into the building, had a wholesome effect upon the manner in which such work, henceforth, was to be handled by architects as well as plumbers. Since no work could be commenced in any building before the plans and specifications filed had been approved by the board of health, the subject of drainage and plumbing received its share of proper attention at an early stage of the construction of the building.

The benefits derived from these measures have, it is true, by no means remained without some drawbacks, which, though not necessarily fatal to the results, still, to some extent, hinder as rapid a progress as might have been expected. To these I desire to make a brief allusion. So far as owners are concerned, we now often find too much reliance placed on their part in the supervision exerted by boards of health. Even with a multitude of efficient inspectors in their employ, this supervision must, of necessity, be very general only, and with the still universal tendency of covering up and luring out of sight those "unsightly pipes and fixtures" much defective work may escape the eye of an argus-eyed and faithful inspector. There is, moreover, in every plumbing job a chance for much botched work, not necessarily involving a violation of any plumbing regulation. On the other hand, since many points relating to house drainage are yet disputed, it cannot be expected that plumbing regulations will become perfect for some time to come. Even the most complete regulations which I have seen contain certain rules and requirements which appear to me to be of doubtful value. Considerations toward manufacturers of plumbing goods will generally prevent boards of health from prohibiting the use of appliances which all sanitarians have long ago condemned. Again, it is obvious that such general regulations must be quite inadequate and incomplete when applied to work in very large and extensive structures. They cannot include rules regarding all the details of the work, for, as is natural, board of health laws can only insist upon and enforce a certain minimum of improvements.

As regards architects, judging from a somewhat extensive personal experience with a number of plumbing specifications, with which I came in contact during the last few years through the practice of my profession, much improvement is noticeable, together with a desire to keep well informed about the progress in the principles and the practice of house drainage. Yet the majority of their specifications continue to be written in a fashion-like manner, without sufficient attention to the details and to improved methods and appliances, and failing to lay proper stress upon the quality of the materials, upon the workmanship required, and upon proper and stringent tests regarding the pipe system. Nor is the inspection of such work a thorough one, and the testing of the pipe system by pressure, if specified, is rarely insisted upon by architects. In those cities where boards of health require the filing of plans and specifications, it became customary with architects to use blank specifications, printed and furnished by the health board, which contain as a guide the essential requirements, the blank spaces in them being simply filled out by architects, who would add a few additional requirements in writing. I do not know whether or not the use of such blank specifications is made compulsory, in which case no blame could fall upon architects for using them. What I do know is that such specifications, as applied to a large building, must necessarily be quite incomplete, insufficient and imperfect, and often appear unsystematic in the arrangement of the subject matter.

The object of a house drainage system has long been understood to be to remove from dwellings at once, and as thoroughly as possible, all liquid waste matters before they undergo decomposition and emit unwholesome gases of putrefaction. In its widest meaning the term "house drainage" is made to include the removal of surface water from roofs and yards, as well as of subsoil water from the ground upon which a building is erected. Strictly speaking, we should distinguish between *drainage* and *sewerage* of a building, the former term referring to the removal of all clear water (roof water, surface water, sub-soil water), the latter to that of fouled waters from the household (sewage). It is often of very great importance to keep

the one separate from the other, as, for instance, in the case of isolated country houses, where sewage is conveyed by *tightly jointed* sewer pipes to a flush tank or other tight receptacle, from which it is disposed of by irrigation or sub-surface irrigation upon or underneath lawns or grass lands, while subsoil water is removed by *open jointed* land drains to the nearest watercourse, brook or open ditch. A third system of pipes generally carries, in the case of rural dwellings, the rain falling upon the roof into a tight cistern or tank for clean water. With city houses it is sometimes, though not often, feasible to carry out the same separation, at least as far as the subsoil water is concerned, provided a special line of subsoil drains has been laid in the street in the same trench with the sewer. As a rule, in the case of narrow city lots, one outlet is common to the drain and the house sewer, but it is one of the most important duties of those who advise in such matters to consider the best means for safely disconnecting the open-jointed tiles from the house or street sewer, to prevent the back flow of sewage and—still more important—of sewer gas from the house sewer into the drains, from where it would easily diffuse into the cellar and rise into the upper floors of a house.

The removal of subsoil water, or at least the permanent lowering of its water level to secure dryness of the house, is equal in importance, from a sanitary point of view, to a proper system of house sewerage and plumbing. It is best accomplished by lines of small-sized, common, porous land drains, laid at least two feet below the cellar floor, with open joints, protected by a collar, wrapping paper or muslin against chokage from dirt, all delivering into a main drain, sloping toward the outlet, either a gutter in the road, an open ditch or water course, or else the sewer in the street. In the former case no further protection is needed at the outlet, except a strong, fixed grating to prevent the entrance of mice or rats. Where subsoil water is discharged into sewers an efficient disconnection should be provided by a deep-seal water trap, kept constantly filled by some automatic device in connection with the water supply of the house.

In advising clients in regard to subsoil drainage, I generally call their attention to a few points regarding healthy house-construction, not strictly belonging to, but intimately connected with, the ventilation and drainage of dwellings, and which in most cases remain unheeded by architects and builders. I refer to the perfect isolation of the house from the ground upon which it stands, and from the water and air contained in the pores of the soil. It is not enough to provide for subsoil drainage under the house; its walls are frequently exposed to moisture, or even water veins penetrated in digging trenches for foundations. Dampness of walls is of frequent occurrence in cheaply built houses as well as the better class of houses where no attention is paid to such apparently insignificant details. Again, the damp vapor of ground air and frequently unhealthy exhalations from polluted soils would constantly rise into the cellar, especially if assisted in their upward passage by the so-called "suction" of house chimneys, unless provision is made for a thorough isolation of the cellar from the ground below by a tight cellar floor, which at the same time will prevent the rise of subsoil water. Asphaltum has proved a most valuable material for foundation walls, damp-proof courses, as well as for the cellar floor, and efficiently accomplishes this much to be desired complete isolation.

A safe drainage of the subsoil being arranged for, we must next provide for the speedy and complete removal of the house sewage, consisting of waste water from flushing urinals and water-closets, together with human excrements and urine, of dirty water from personal ablutions in washbowls and all forms of bathing tubs, of chamber slops, of foul laundry water and water used for rinsing cooking vessels and cleaning dishes. The amount of sewage will be largely increased at times if the rainwater falling upon the roof and upon paved areas and court-yards is also admitted into the house sewer. Whether this should be done or not will depend upon the system of sewerage existing in any place, but even where the street sewers are designed to carry and to ultimately receive more or less rainfall, the question arises whether it is better to have within the house a single system or a double set of pipes, one for sewage and another for rainwater. This cannot be decided in a general way, for it becomes necessary to take into consideration the special conditions of each building. This much may, however, be stated, that it is preferable to keep the vertical pipes leading the water from the roof separate from vertical soil or waste pipes.

In a brief article on the subject it is, of course, impossible to refer to the many details of plumbing, and I must, necessarily, restrict myself to a statement of the leading requirements and general principles governing the planning and arrangement of such work. What, in the light of present definite knowledge of the subject, I consider as essential and as applicable *without modification* to all classes of buildings, to the drainage and sewerage of both the largest and most expensive mansion and the smallest city house or suburban cottage, may be summarized as follows:

I should use within a building metal pipes only, principally iron pipes, with the exception of the short branch waste and supply pipes, which may be of lead. I should commence with the iron drain at least five feet beyond the foundation walls so as to make sure against breakage by settle-

ment of walls, and to further guard against the latter serious calamity I should always advise to turn a relieving arch across the wall where the pipe passes out. In the case of country houses with a water supply derived from a well in the vicinity of the house, I should advise carrying the house sewer of iron to a point well beyond the probable limits of the drainage area of the well. I should recommend to use, even in those houses where due regard to economy must be had, extra heavy pipes of uniform thickness and tested under pressure before use and before applying a protective coating of coal-tar or a similar substance, so as to avoid any imperfections in the pipe which may be covered up by the enameling or other process. I should also insist, at a later stage of the work, upon a proper test of the pipe joints in order to make sure that the whole system is air-tight as well as water-tight beyond any doubt. I should advise to use a diameter of only four inches for the main pipe of a single house of ordinary size, and should restrict the size of the main drain of larger buildings to six inches, preferring to arrange two or more systems of six-inch main sewers for the largest institutions in place of an eight or ten-inch pipe.

I should, wherever possible, banish all plumbing fixtures from the cellar floor, in order to carry the house drain in plain sight along one of the cellar walls, or else suspended from the cellar beams. I should give the pipes in the cellar all the fall possible, in order to insure a good cleansing velocity of the flow in the main pipe, and wherever the needed fall could not be obtained, I should advocate the use of flushing tanks of some kind at the head of the drains. I should suggest to strongly support the main drain and its branches by brick piers, placed at suitable intervals, and especially at the junction of all upright pipes, and would take care to have all junctions made with Y branches instead of T branches, and all changes from the direct line made with curves of an easy sweep. I should recommend the use of cleaning handholes, at intervals, along the main line, at junctions, bends, and near traps, but I should also strongly counsel the thorough and tight closing of all such inspection openings.

I should carry all upright soil pipes, and all lines of waste pipes, in the straightest practicable course, and with as few elbows as possible, up to, and through the roof, and should advise making this extension, in no case, less than four, and preferably six, inches diameter, to provide a free outlet above the roof. This outlet I should carry well above the roof line, and should keep it as far away as possible from any chimney flue, ventilating-shafts, dormer windows, etc. I should earnestly and firmly insist upon a copious and constant circulation of fresh air through all drain, soil, waste and vent pipes, and should, with this end in view, provide a suitably large inlet for air, at the lowest point of the system, and extend all pipes at least full size above the roof, doing away entirely with any ventilators, cowls, caps, or, worst of all, return bends, covering the mouths of pipes. If there is ground to fear an accidental or malicious obstruction of the pipes, I would urge the use of only a wire netting, or a common leader guard inserted into the pipe mouth, or else I would extend the pipes sufficiently high to keep out of reach of mischievous persons.

I should recommend locating all fixtures as much as possible in vertical groups, in order to get a straight, simple, and direct arrangement of soil and waste pipes, and to reduce the length of branch waste pipes, thereby securing a more thorough and direct discharge of fixtures. I should never use a soil pipe larger than four inches inside diameter, even for the greatest possible number of fixtures, and should limit the size of upright waste pipes for sinks, basins or baths to two inches.

Regarding plumbing appliances, my advice would always, even in the case of the most costly residences, consist, for obvious reasons, in reducing their number, and consequently the amount of plumbing work, as much as practicable, and to avoid placing fixtures in spare rooms, where they would not be constantly used. I should, further, recommend to locate all fixtures in well lighted and well ventilated rooms, thereby insuring a proper use, and a better care of the appliances. I should abolish all plumbing from sleeping-rooms, confining the same to the bathroom, the kitchen, the laundry, the pantry, and to well lighted closets. Although the subject of warming and ventilation cannot be here considered, yet I should insist upon a proper and constant change of air in the bathrooms and water-closets. This involves the introduction and thorough diffusion of an ample supply of pure air from outside, moderately warmed (in our climate during at least seven months of the year), not only to increase the comfort of the bathroom, but also to prevent the freezing of supply pipes, or standing water in traps. It also requires the removal of the foul air, which can be attained in a simple, yet efficient manner, by arranging a gas-burner in an outlet-flue of ample size. These are matters which begin to be better understood in the construction of houses, but I desire to call attention to a defect which I have frequently noticed in otherwise well ventilated houses, namely, that where a strong suction exists from the outlet-flues or chimney-places provided in rooms, halls, or staircases, the supply of air, and sometimes noisome odors, are frequently drawn from a bathroom or slop-closet. Hence it should be borne in mind, in arranging a general system of house-ventilation, that the ventilation of apartments containing water-closets,

urinals, slop-hoppers, or other fixtures, requires special attention, and that to be effective and reliable there should, preferably, be a constant movement of air from the other parts of a house toward and into the bathroom; in other words, it is of prime importance to arrange a well drawing outlet-flue in a bathroom or water-closet apartment, which would tend to create a slight vacuum in said room. Sufficient air being thus constantly removed, fresh air will easily come in to take its place, provided it is admitted in ample quantity into the other parts of a house. Where a building is ventilated by *plenum ventilation*, it is better not to include bathrooms or water-closet apartments in such a system.

It should be the aim to have the whole plumbing work arranged as simply as possible. Supply-pipes must always be so located that they will not freeze in cold weather, and it is preferable to keep them away from outside walls, unless special protection is given them. Household, having lived during a winter in an exposed country house, are always ready to appreciate measures tending to the protection of water-pipes against frost.

Whenever I am left untrammelled by prejudice I always arrange all plumbing work in an open manner, leaving all appliances, traps, supply and waste pipes exposed to view. The advantages gained hereby are twofold. In the first place, I secure a better and more thorough workmanship of those parts of the work which, being usually tightly boxed up, are very apt to be less carefully finished, and this is true not only of the plumber's work, but also of that of the carpenter. From a sanitary point of view, and likewise for other reasons, it is quite important to have all those unsightly holes where pipes pass through floors and ceilings tightly and permanently closed, to prevent diffusion of air from one story to another. I recently examined a bathroom in an apartment house, where at each cold spell such a violent draft was rising through a pipe channel leading from the cold basement to the upper floors, along the soil and supply pipes, as to completely chill and cause the freezing up of the water in the pipes, much to the annoyance of the house owner, who could hardly get along without the plumber as soon as the thermometer would reach the freezing point, yet the plumbing in this building was done "in accordance with all the board of health rules" and had successfully passed inspection.

A second advantage obtained by leaving plumbing work fully exposed to view is that there is a better circulation of air around the fixtures, that the cleaning and scouring operations of servants are much facilitated, that all parts of the work are easily accessible and readily inspected, and that repairs are less frequent, and if required, that there is little or no tearing up of woodwork, floors, and base boards. An open arrangement also aids in enlightening the anxious minds of some householders concerning the "hidden mysteries of plumbing work." What is true of plumbing fixtures is, of course, equally applicable to the system of pipes in a dwelling. I strongly advise keeping all pipes outside of walls or partitions, locating them, where possible, in closets or in inferior rooms. This enables one to inspect at any time any pipe joints or to readily reach any stop-cock or valve, should it be necessary to shut off the water from any pipe. I generally dispense with unsightly lead safes under fixtures, believing that with the open arrangement a leakage cannot remain unnoticed for a sufficient length of time to work serious harm, especially where floors and walls (to the usual height of wainscoting) in kitchens and bathrooms are made water tight, and finished in tiles, plain or ornamental, or in simple *terrazzo* work. If required I arrange a drip pipe to remove any water from leakage, which pipes must always be kept entirely disconnected from any soil or waste pipe.

As to the fixtures proper, I should select, for an inexpensive cottage as well as for a luxuriously furnished city residence, those of a simple character, with a smooth and non-absorbent surface, the exact material of the fixtures often being mainly a question of cost. For water-closets, slop-hoppers and urinals, which latter, however, I avoid in private houses, I should give preference to those with a small fouling surface, made in glass or in earthenware. I recommend, of course, using water-closets without any mechanism or moving parts liable to get out of order. I would, wherever I could, avoid the use of fixtures requiring a hidden overflow pipe. Bathtubs of all kinds, washbowls, pantry sinks, water-closets and urinals may now be had of such a form and construction as to do away entirely with concealed overflow channels, which are often the cause of annoying odors.

I should locate fixtures as near as practicable along a soil or waste pipe, to avoid the always objectionable branch wastes under floors, and vertically above each other, to reduce the number of pipe stacks, and should aim to give to each fixture an independent and direct discharge into the vertical pipe. I should insist upon the separate, safe and secure trapping of every fixture and should prefer, if they were obtainable, as they no doubt will be at a future day, self-cleansing traps, placed as close to the outlet of fixtures as possible and made entirely of glass, with the water seal fully exposed. I should make arrangements to secure to each fixture in a building an ample and never-failing supply of water. In the case of water-closets, slop-hoppers and urinals, I should always use a separate flushing cistern,

while as regards the other fixtures I should give preference to those arranged and constructed in a manner so as to constitute in themselves a small flush tank, thus securing by their quick discharge (through outlets larger than commonly in use) a thorough cleansing and scouring of the waste pipe serving them. I should never have a direct connection between any water cistern, a refrigerator or ice-chest in a house and the drains or soil pipes, and I should guard with particular care the purity of the supply for drinking purposes.

I have, as far as the space at my disposal permits, outlined the leading requirements of a proper system of house drainage, and I confidently believe that, wherever they are conscientiously followed, satisfactory results cannot fail to be secured.

A few points, however, have not been referred to. There is, for instance, the "trap on the main drain" question, which is still agitating the minds of many. I do not feel inclined to be dogmatic about it, for in my own practice I have never followed an iron rule, but have, on the contrary, in each special case, carefully considered and weighed the circumstances and conditions affecting the question. I always use a trap on the line of the drain, if the latter discharges into a cesspool or any form of tank in which sewage is stored for some length of time. I generally advise the use of a trap where the house drain connects with a foul sewer, as in the majority of cases in our large cities. If I use a trap, I should insist upon having it easy of access (but not so as to be exposed to freezing), and provided with proper cleaning handholes. When a house drains into a street sewer, forming part of a well planned general system of well flushed sewers, ventilated by open soil-pipes in the houses, constructed under supervision of a competent engineer, I should not object to the omission of the trap, always provided the work in the house is thoroughly well done. Where the owner would not mind the additional expense, I should, probably, prefer to arrange for the ventilation of the sewer by a pipe carried up to the roof, along the outside of the house, thus pre-erving a complete disconnection of the house interior from the sewer. Wherever I use a trap, I should also arrange a fresh air inlet, to induce a current through the soil-pipe system. I should, however, strongly advise my clients not to terminate the inlet in a box in the sidewalk, covered with a grating, as is so often done, which grating frequently becomes obstructed and closed in winter time. Nor should I carry the fresh air pipe up to the roof. Where to arrange the inlet is a matter which can be determined only in each special case, and which ought never to be restricted by a hard and fast rule, often entirely defeating the purpose for which the inlet was established.

The question of material most suitable for drains, soil pipes, waste and supply pipes has not been alluded to, nor have I, in my above recommendations, referred to the many kinds of water seal and mechanical traps, advocated to exclude sewer air from the fixtures. I do not feel disposed to enter into a discussion of the merits and disadvantages of the "venting" of traps, the chief object of which is to prevent siphonage. Experiments have established, with a sufficient degree of certainty, the fact that the self-cleansing S-, P-, or running traps, cannot be depended upon always to retain their water seal against siphonage, unless air is admitted at the crown and sewer side of the trap, by a so-called "back-air" pipe, of ample size. Consequently, I should not use such traps without providing such protection as the back-air pipe affords. Later experiments have shown that an air pipe is not a reliable protection in *all* cases, especially where fixtures are not in constant use, as it furthers the evaporation of the water in traps. That it increases the cost of plumbing, and hinders simplicity of arrangement must be conceded by all. It offers, undoubtedly, certain advantages in many instances, but there may be cases where the disadvantages would predominate. It remains, then, to be decided, only after a thorough and intelligent consideration of all conditions, whether a seal retaining water-seal trap, safe against back pressure, siphonage or other influence, may not be preferable. The question cannot, in my judgment, be decided in an off-hand way. Being of grave moment for the safety of the inmates of a house, the question of trapping should receive an earnest, thoughtful and unprejudiced consideration. Unfortunately, discussions on this point, in sanitary and architectural journals, have not always been divested of useless and much to be deprecated personalities.

As with traps, I also prefer to omit, purposely, the description of any special plumbing fixtures. There are now a number of each kind in the market, possessing merits and giving satisfaction, which a judicious house owner may select, guided by the above hints.

In conclusion, it must always be borne in mind, that no system of plumbing or drainage will work forever, without proper care, attention and periodical inspection; that stagnation of water or air must be avoided in drain, soil and vent-pipes, as well as in traps; that the water in the latter should be frequently changed; and that, in the tight jointing, safe trapping and constant ventilation of pipes, together with the frequent flushing and thorough cleansing of fixtures, consist the principal safeguards of a proper system of house drainage and plumbing against entrance and diffusion of noxious sewer gas.

Tangier Sketches.

BY IRVING K. POND.



On the African side the land rises gently, with bright and smiling face, from the dark water into which it flung itself so precipitously from Gibraltar's lofty, frowning rock. It could not have been long after the dive was first made that Tangier, though then called by another name, came down to the seaside to welcome the new land, and settled herself snugly down between the arms which were stretched out to protect and shelter her. But one other city now known to us existed at

the time of the founding of Tangier. Rome was yet to be born, and the little African city was to pass the period of its highest prosperity before the Roman eagles should be able to fly in safety beyond the walls which kept the barbaric hordes from devouring the tender body of the future mistress of the world. Tangier, old and feeble while the civilized world was yet young, has time and again fallen a prey to contending barbarisms and civilizations. Now Morocco claims what little vital force remains to the city. The city today is interesting chiefly as a relic of past ages and has been an expensive piece of bric-a-brac in the cabinets of many a powerful nation.

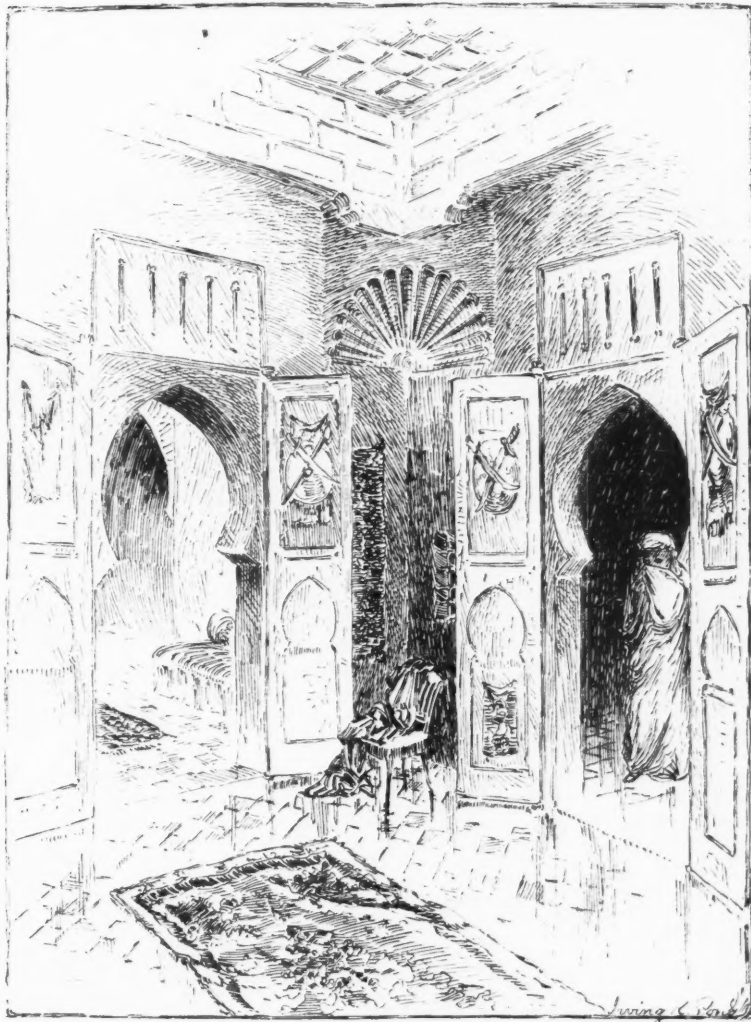
Tangier rises in terraces back from the bay. To the right and left the ground is higher, while a valley leads gently down from the market place beyond the walls to the principal water gate near the custom house on the shore. Up this valley runs the principal street, which becomes so blinded by the glare of the white walls on either hand that it can go straight but for a few yards, when it suddenly staggers off at an angle and takes a zig-zag course till it reaches the door of the principal mosque, where, being dignified with the title of "square," it travels circumspectly for quite a few paces; just till it reaches the café, though, from which point it resumes its zig-zag journey to the market-place.

This erratic thoroughfare staggers along under the load of an awful name, which, translated into English, signifies the principal street. This is the only passage bearing a name, and I do not well see how the others could keep one, for they would lose it, as they lose themselves at every corner or under some dark archway.

On the high ground to the right stands the castle. This name is applied to a group of public buildings, clustered about

an irregular courtyard and overshadowed by a tall tower set in brilliant glazed tiles. Portions of this quaint pile of buildings tell plainly of the times when Rome held sway to the western border of the world, when Tangier was a Roman military post; and other newer, though still old, portions tell sorrowful tales of expulsion and exile, and echo faintly, very faintly, the happiness of old Moorish life on the plains and hills of Granada. The architecture of the city calls but for a passing glance. The Moors have never decorated their dwellings here as they did in Spain. It may be that their residence in Tangier is regarded as temporary, for the Moors of Tangier are lineal descendants of the Moors of Granada, and still keep the keys of the houses from which their fathers were driven, and still hope to regain and occupy the lost possessions. The houses are in general poor one storied affairs with no openings to the street other than the door. Now and then there is a second story overhanging nearly or quite the entire width of the street, which averages about six feet. All architectural decoration is confined to the *patio* and to the interior. The roofs are flat and white, and the houses, as they climb up toward the castle, seem like the steps of an immense irregular stairway leading to the den of some giant in the fortress above. The light of early morning will disclose the forms of sleeping natives stretched out on mats on the roofs.





The privilege of sleeping on the roof is accorded only to the householder and his family; the servants and slaves sleep in the streets, which were made, it would seem, just sufficiently wide for their accommodation. A night pedestrian in Tangier generally carries a lantern in front of him at the end of a long pole, otherwise he would be apt to bring to a sudden climax some Moorish snore—though the Moors are rather quiet sleepers—or would get his feet tangled up in the hair of a sleeping Riffian. This matter of servants in the streets is quite peculiar. You see a hole in a wall, and just across the street are the servants, some stretched out at full length, some with their backs up against the neighboring walls, and some with their feet against their master's houses, while their heads are on the other side of the way, all, however, watching the hole in the wall. Now and then a figure appears at the opening from the inside, and at a motion or a word from it, one of the dozen vagabonds starts up and goes off on a trot to execute the order or perform the required service, and having completed his task comes back and drops into place again.

Now, when one is wealthy and has a great body of servants, it is more or less difficult to pass the house at night without seriously interfering with someones' slumber. The dogs, too (not the Christians, but the real four-legged dogs), are privileged to sleep in the streets, and in general it is safer to step on a servant than on a dog.

Then, as to the Riffians—well, the Riffians do not belong to the Moorish upper tendom. The name these people bear and our English name ruffian are, it is said, closely related. In Tangier this fact would not speak well for our ruffian. These Riffians expect sooner or later to enter paradise, and, outside of being very good, do what they can to effect an entrance. They cultivate a lock of hair, just above and behind the right ear; this particular lock is never cut; the remainder of the hair is always closely cropped. The belief is, that at the last day the right hand of the gathering-in angel will sweep down and, clutching the lock of hair, will jerk the owner into heaven. They do not care to sail in on untroubled seas; their desire is to be jerked in. As to the head gear and future hopes of the Riffianess I cannot say. All one sees of her is the shapely ankle and the piercing black eyes.

The sleepers in the streets need not fear being disturbed by a wheel. I do not think there is a wheel in Tangier. In case of heavy burdens mules offer the necessary resistance to the force of gravity, while broad-

backed negroes push the burden and the mule along. It is a common sight to see a little mule which one would think had hardly strength to carry its own head, staggering up a steep narrow street, supporting on its back a cask large enough to contain the mule itself, together with three or four negroes who are aiding the little animal in its task.

Tangier is the principal seaport of the empire. The bulk of the trade is with Gibraltar. The garrison of this rocky fortress, as well as the inhabitants of the thriving city at its base, receive their supplies from this African town. The country round about Tangier is highly productive, and for miles toward the interior orange and olive orchards stretch, in almost perpetual bloom, while fruits and vegetables develop and mature in abundance, requiring little or no care or training. So Tangier is a good market town, and the "place" just outside the walls at the head of the principal street, presents an extremely interesting and picturesque, as well as busy, appearance on market days. This spot is the starting and stopping point for caravans to and from the interior, and "ships of the desert" are moored about on all sides. The mode of anchoring a "ship" is peculiar. A fore leg is bent double at the knee and kept in that position by means of a cord wound around the leg just above the knee joint. The "ship" thus hampered with cordage gets under headway with difficulty, and is practically anchored. Besides the camels, every other manner of beast of burden from the stupid, stunted mule to the spirited Arabian charger, is to be found. And then the people. Here is an interesting study from more than one standpoint. There is the bronzed featured Moor with the dignified bearing of one who has come of a long line of noble ancestry, wrapped in a white camel's hair garment, which probably belonged to his great grandfather, or which was in the family, it may be, before his time. Then, there is the Moor of low estate and the Riffian in rags and tatters, still with a fair share of dignity. There are negroes with ebonized limbs with a polish produced by a great amount of friction and no water, except what little may have accidentally spattered on them as they carried drink from the well under the walls to the thirsty "ships." The clothes worn by the blacks are not burdensome, and are often effective in wear. There are to be found the Jew merchants who are just as little given to the use of water as a cleansing agent as are the negroes, and whose clothes are as brilliant and varied as they are voluminous. There are Moorish soldiers and Arabian sailors and Moors from the interior, in brilliant oriental garb.



The rich colors and polished skins gleam in the intense sunlight so that the picture is fairly burned upon the retina.

After gazing on this living picture from an eminence near at hand, I descended into the throng to study human nature and to hunt for the booth whereat the finest fruit might be purchased. The second part of my mission was satisfactorily accomplished. I found the fruit, and in exchange for a considerable quantity laid down a Spanish silver piece worth about twenty cents. The merchant commenced counting out change from a large basket of coins. Before he had counted many moments I saw that in order to reach my hotel with the fruit and the change I must have the services of a strong man or a mule, or both, and as that would cost more than the change amounted to (what that was I never knew) I concluded to leave the money and carry the fruit myself.

Although Tangier is a seaport and an important one, its dock facilities are rather limited. Rarely are there more than two vessels of any considerable tonnage anchored off the town on the same day. The cargo is transported to and from the large vessels in small boats. The water is so shallow that these small boats cannot approach very near to the shore, so the cargo is transported to and from them on the backs of porters. Formerly passengers were transferred in the same manner, but it was decidedly displeasing to the Moor to carry a "Christian dog" on his back, so a short time ago a light landing stage was built out for the convenience of those who were averse to taking off shoes and stockings and wading ashore.

As Morocco is tributary to no Christian nation, Mohammedan laws and traditions are in full force. More or less antipathy exists toward foreigners. The mosques, which in Algiers and other provinces may be visited by Christians, are here closed to all but the faithful. An inquisitive stranger can tell about how many of the faithful are at their devotions by counting the pairs of shoes left at the doorway, for the Moor never wears his shoes into the mosque, nor in fact does he in the café or the dwelling, and he never presses a shod foot upon a rug or carpet. Religious fanaticism and superstition have a strong hold on these people. Their money and the portals of their houses bear a stamped image of some object, as a star or a hand, which is to keep away evil spirits. I nearly depopulated a café one day by innocently persisting in sketching the interior and its occupants. It is just as well that I did not understand the mumbled words of some of the retiring "faithful," for I probably would have heard nothing to my advantage. Telegraph and railroad are still unknown, and probably will never get foothold on this benighted shore, and another hundred years will be apt to find Tangier as near to civilized Europe and as far from European civilization as this year has found it.

Recent Fireproof Building in Chicago.

BY P. B. WIGHT.

THE recent construction in Chicago of a large number of fireproof buildings, all varying to a slight extent in the methods of construction and fireproofing employed, but built according to two leading systems, not only evinces that capitalists are now alive to the importance of depending upon something better than insurance for the protection of their property, but calls for an explanation of the reasons why there should be such an apparent divergence in the methods employed in building.

It is only in recent years that fireproofing has assumed the dignity of a science. Up to five years ago, so-called fireproof buildings were erected by the score, but wherever they may be said to have any real fireproof qualities, it has been more the result of accidentally felicitous combinations of materials and arrangements to produce such results, than the careful study of the intensity of heat in burning buildings and its effects on building materials. The earliest buildings of this class were the best of the public buildings at Washington and elsewhere, in which vaulted construction was employed for floors instead of the usual wooden beam construction. The extent to which this could be used depended upon the stability of the walls, and it was a luxury which could only be indulged in where the land was of little value compared with the cost of improvements, where the buildings were low in comparison with their length and breadth, and where ample funds were appropriated for the purpose. The architects of these structures had less in view the fireproof qualities of the buildings than the erection of stately, massive and imposing structures to defy the ravages of time. There was nothing original in such constructions. They were repetitions of old traditions in the building art, which were supposed to be applicable to public buildings of the better sort. These buildings were generally covered with wooden roofs, and this alone shows that their fireproof qualities in the lower stories were accidental. Such was, and still is the construction of the central part of the capitol at Washington.

Amateurs frequently love to display their erudition in the public prints, especially after some great fire which has been unusually destructive to life as well as property, by telling us that nothing but bricks will stand fire, and brick vaulted rooms alone are fireproof. But no one who builds for an income will ever waste land or money on such constructions.

About thirty years ago, when timber had commenced to be dear, and the wrought iron I-beam was invented simultaneously in France and England, America rapidly commenced to appropriate it to its own use. The valuable properties of cast-iron as a constructive material for the manufacture of posts, columns and short lentils, no less than the building of entire exteriors had just been discovered. As iron would not burn like wood, no one stopped to inquire further about it, but the whole world proclaimed it to be the fireproof building material of the future, which would enable us to erect "fireproof" buildings without wasting land, and with great economy of space in every direction. Moreover it was not too expensive considering the results supposed to be obtained.

Cast-iron fronts were merely substitutes for brick and stone and had to compete against them in the market. But the popular opinion was that they could not burn, and that to such an extent the buildings on which they were used were fireproof. Hence, when several such buildings in New York were burned, and the fronts fell down flat on their faces in the street, the average newspaper reporter was greatly nonplussed and befogged in his graphic descriptions, and wondered how iron buildings could be burned.

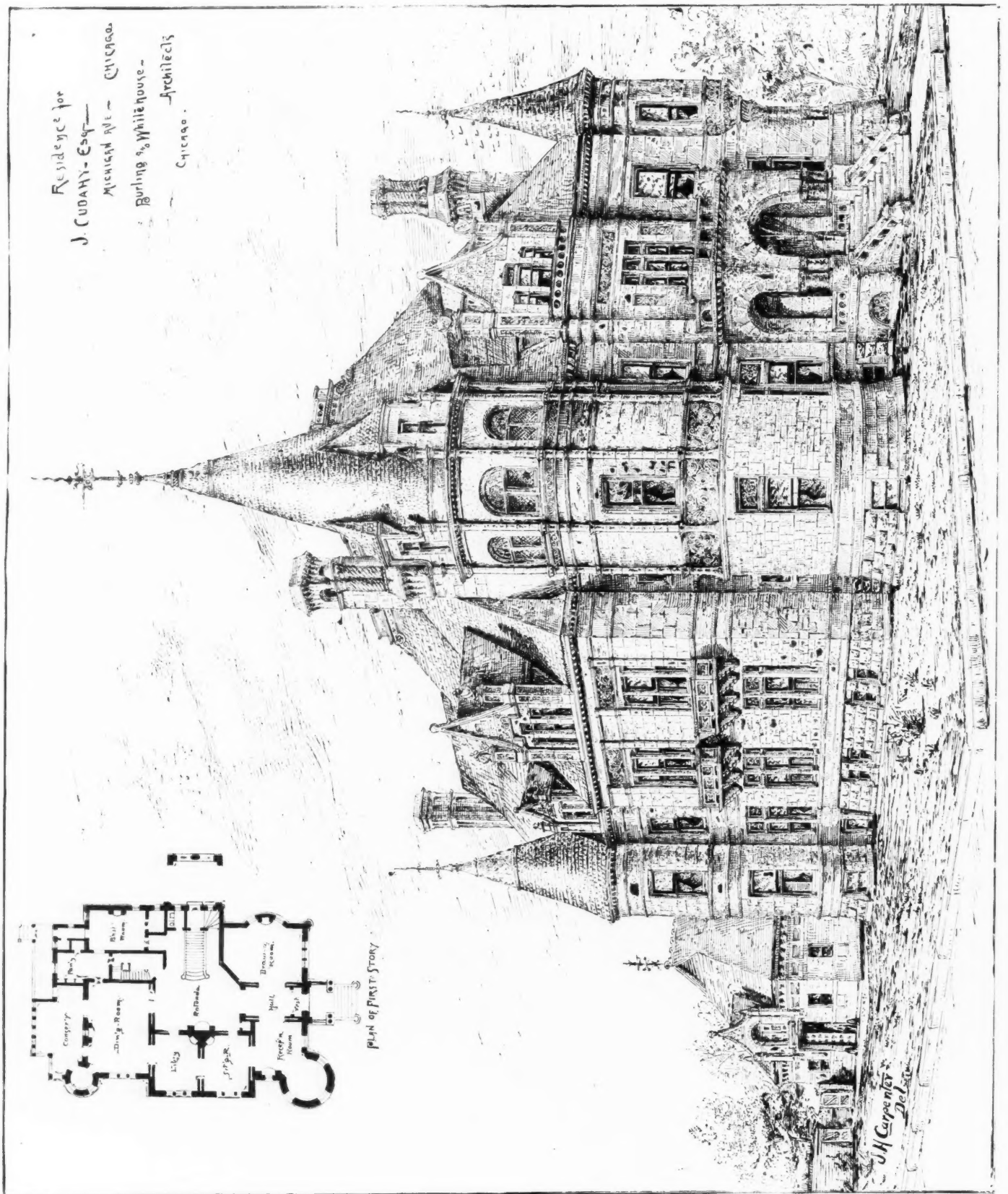
But to the credit of the architectural profession, it may be said that the architects did not consider cast-iron fronts to be essential to the construction of "fireproof" buildings. Their exteriors were made much the same as before, brick being preferable to stone for outer walls, except in public buildings where stone or marble were considered essential to their monumental character. But the interiors were filled with iron columns, iron girders and floors of I-beams carrying brick arches between them, the lower flanges, most liable to expansion in case of a fire, being entirely exposed, while roofs were of lighter constructions covered with corrugated sheet-iron, and there are many who consider these to be all that is essential in a fireproof building at the present day.

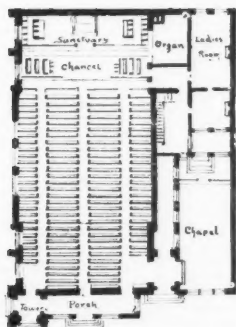
They have been practically demonstrated by numerous instances of costly experience to their owners to be not fireproof buildings at all. They are simply *incombustible* buildings so far as iron and bricks are used in them. They are *combustible* just so far as wood is used in them. When the wood is in sufficient quantities to soften and melt the iron, they are *destructible* buildings, and of the worst kind. When they burn, the destruction is almost absolute. One of the most costly features in this thoughtless system of construction is the great expense of removing the ruins, which consist of a tangled mass of bent, twisted and broken iron, mixed with bricks and other debris. The expansion of the iron generally destroys the brickwork, which would not be the case with ordinarily good walls, were timber used instead of iron.

The combustible nature of the interior woodwork and contents of such buildings has always been a source of danger, and has seldom, if ever, entered into the calculations of those who have planned them or the interested parties who have paid for them. This allusion brings up an important and fruitful subject for discussion. And to bring the matter home to my readers, I wish to say that I am constantly told by prominent architects, no less than underwriters and others directly interested in fireproof building, that in such-and-such a building "there is nothing to burn," meaning, of course, very little to burn, as a reason why thorough protection, according to latest methods, is not necessary. The cause of this too popular delusion is the general want of knowledge of the intensity of fire in burning buildings, and even where it is proposed to make buildings fireproof according to the latest developed idea of protecting construction, this has frequently led to the use of cheaper materials and methods which will not withstand severe fire tests, and the omission of one or more items which might be fatal to the whole structure.

No class of men are better informed on this subject than the experienced officers of our fire departments, and no class are less consulted, where their views will always be cheerfully given. Beyond this class, no one is more competent to form an opinion than he who has habitually run to fires. The writer feels that the first incentive to do something to stay the ravages of fire was received when as a boy he was drawn by natural curiosity into this habit, which never faltered, and afterward led to serious investigation, and he owes more to the suggestions of the "fire-laddies" than to those from any other source. He has always found them modest in the expression of opinion, and is always glad to have their criticism of his own work, which has been in the main just and intelligent. They know better than anyone else the faults of buildings on which millions have been lavished to very little purpose, and they know it because it has been the experience of their lives to learn the practical results of intense heat. I do not hesitate to say that few others do know this, and that property owners all over the country are content with a comfortable sense of security, where there is little or none at all. And the reason is that the full destructiveness of fire is not generally realized.

A few allusions to instances where there was *something* to burn may be appropriate right here. Before the great fire of Chicago as many as a dozen incombustible buildings had been erected. They were all within the

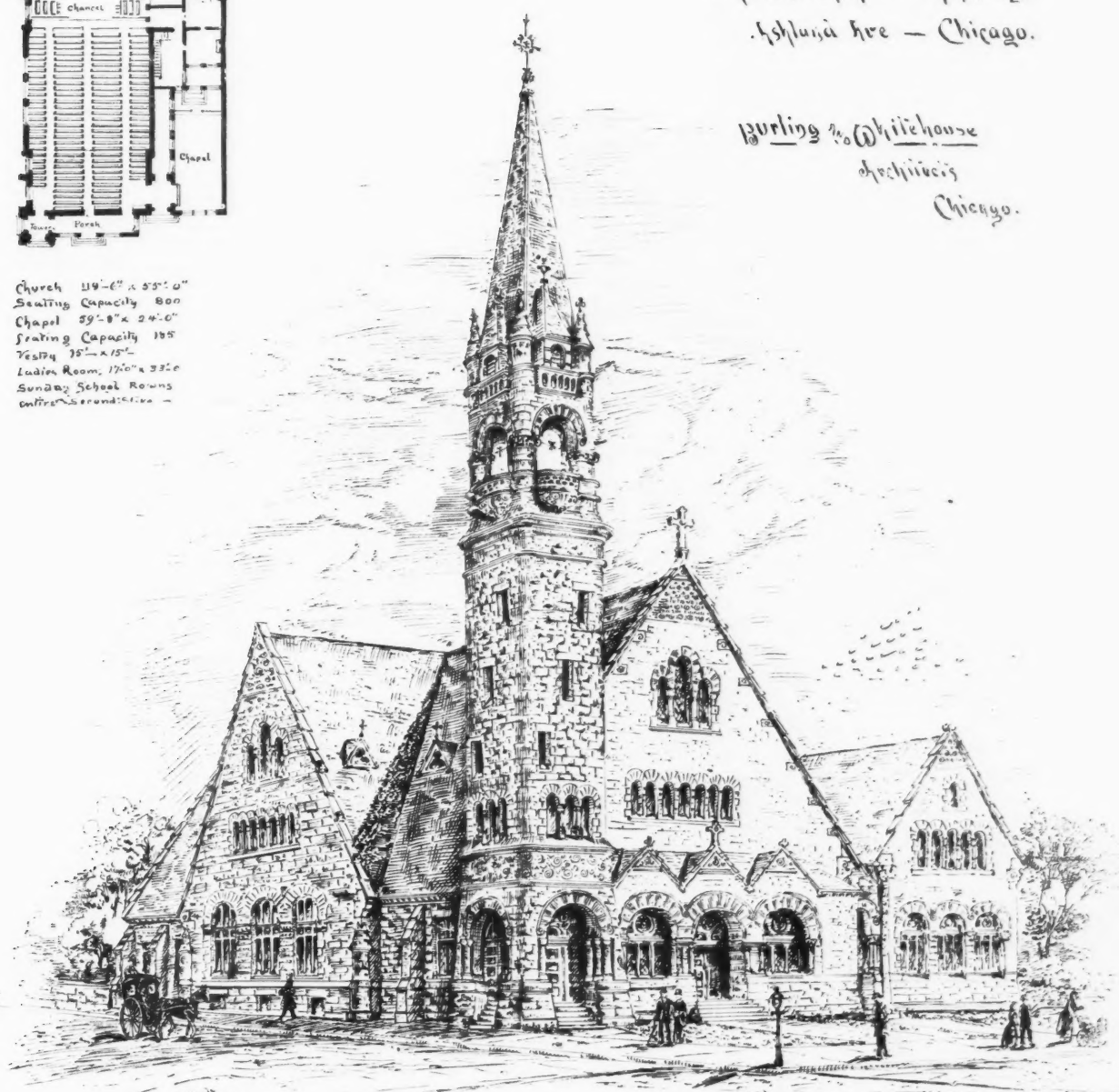




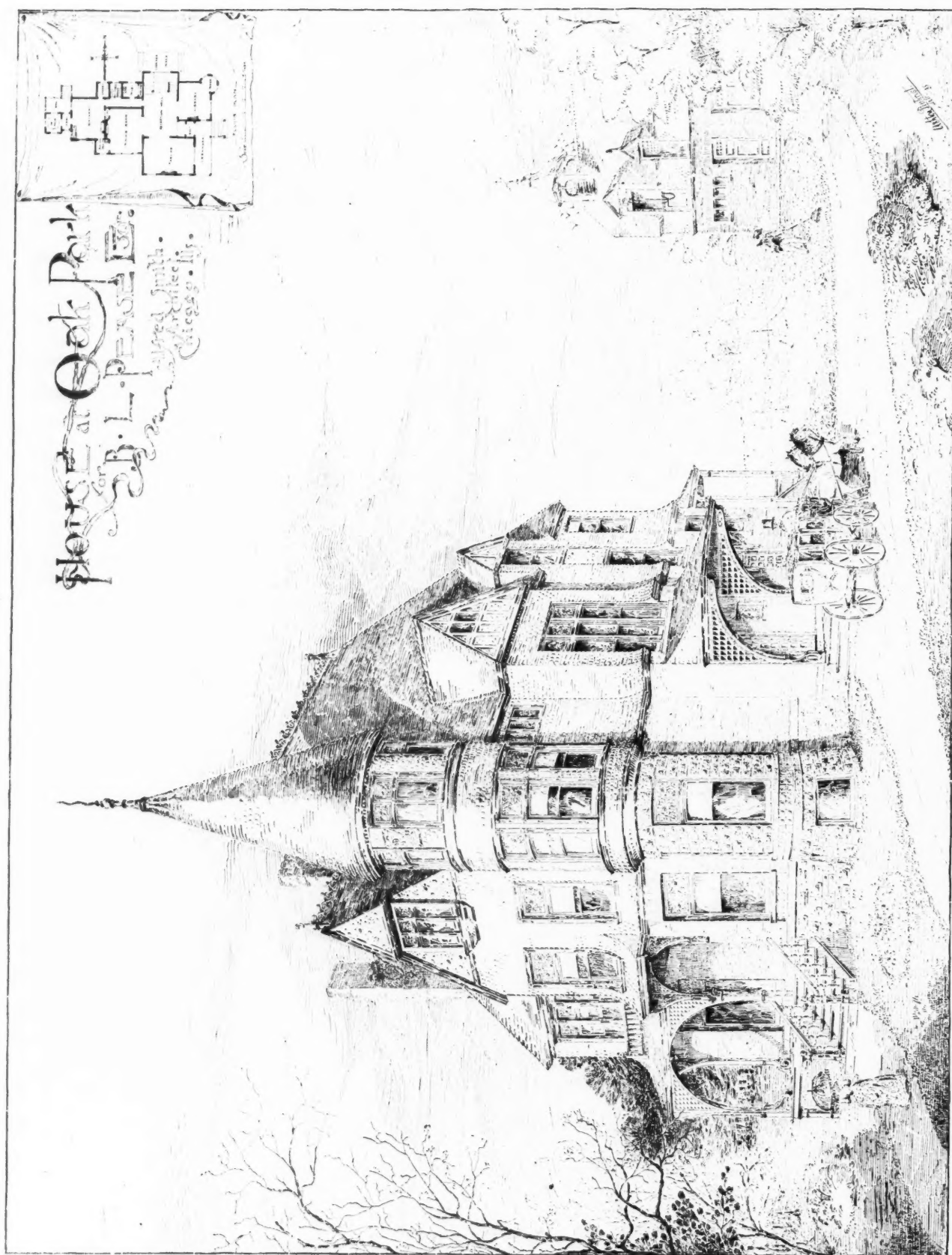
Church 34'-6" x 55'-0"
Seating Capacity 800
Chapel 39'-8" x 24'-0"
Seating Capacity 105
Vestry 15'-0" x 15'-0"
Ladies Room 17'-0" x 33'-0"
Sunday School Rooms
Coffin Room 6'-0" x 10'-0"

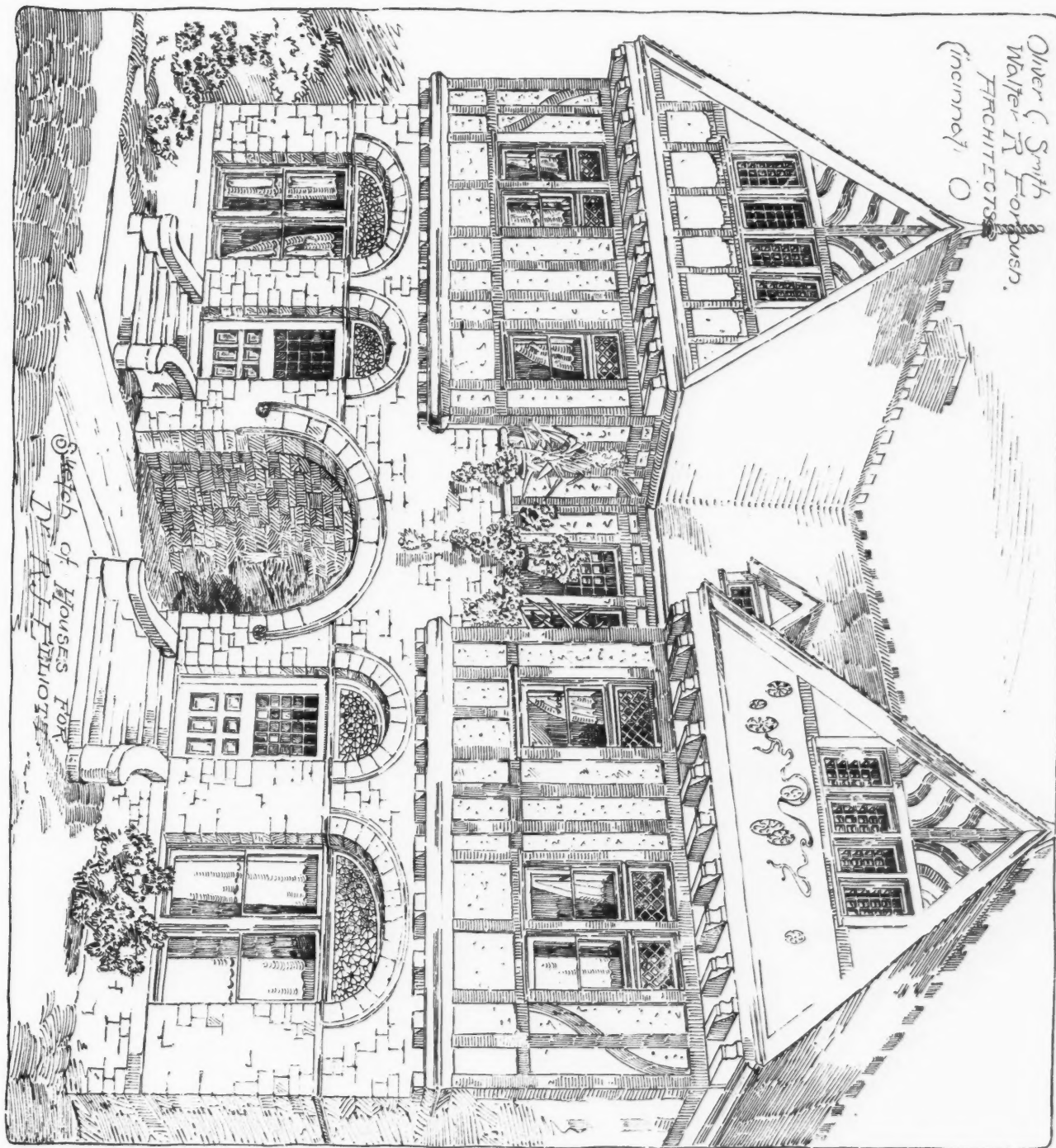
Accepted Design of
The Church of the Epiphany
Ashland Ave — Chicago.

Burling & Whitehouse
Architects
Chicago.



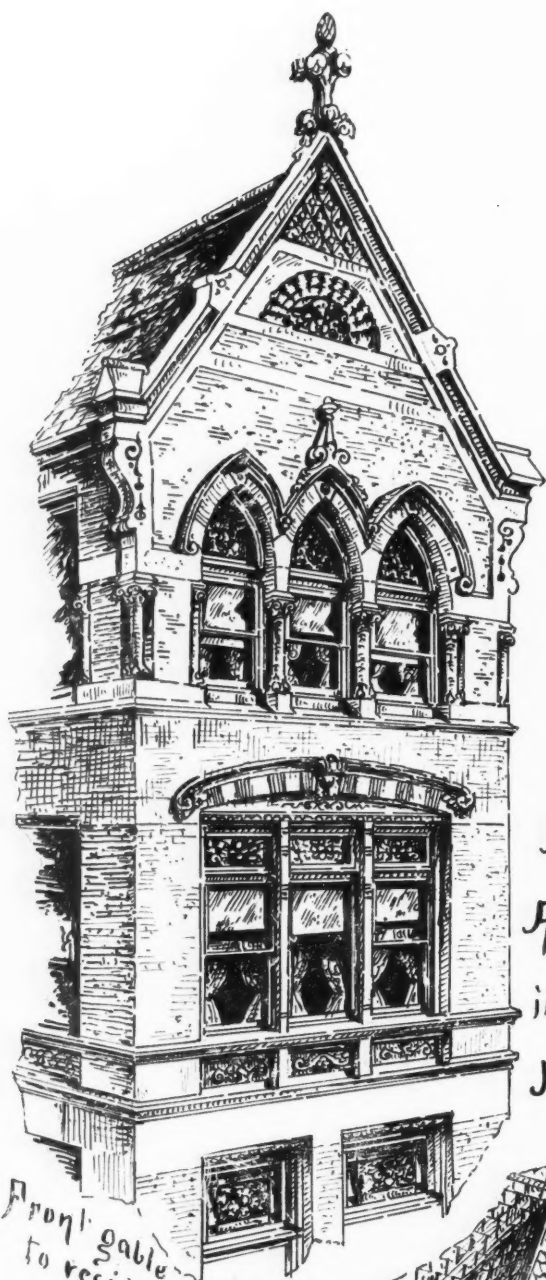
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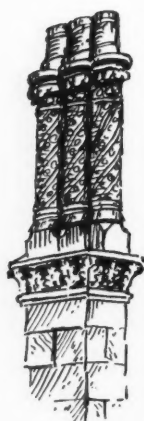


Oliver C. Smith
Walter R. Forbush.
ARCHITECTS.
(incorporated)

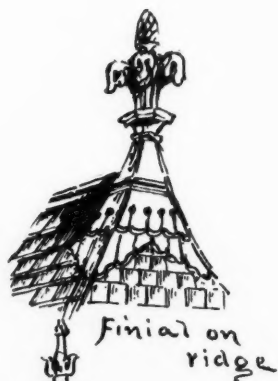
Sketch of Houses for
Dr. R. J. Elliott



Front gable
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Michigan Ave
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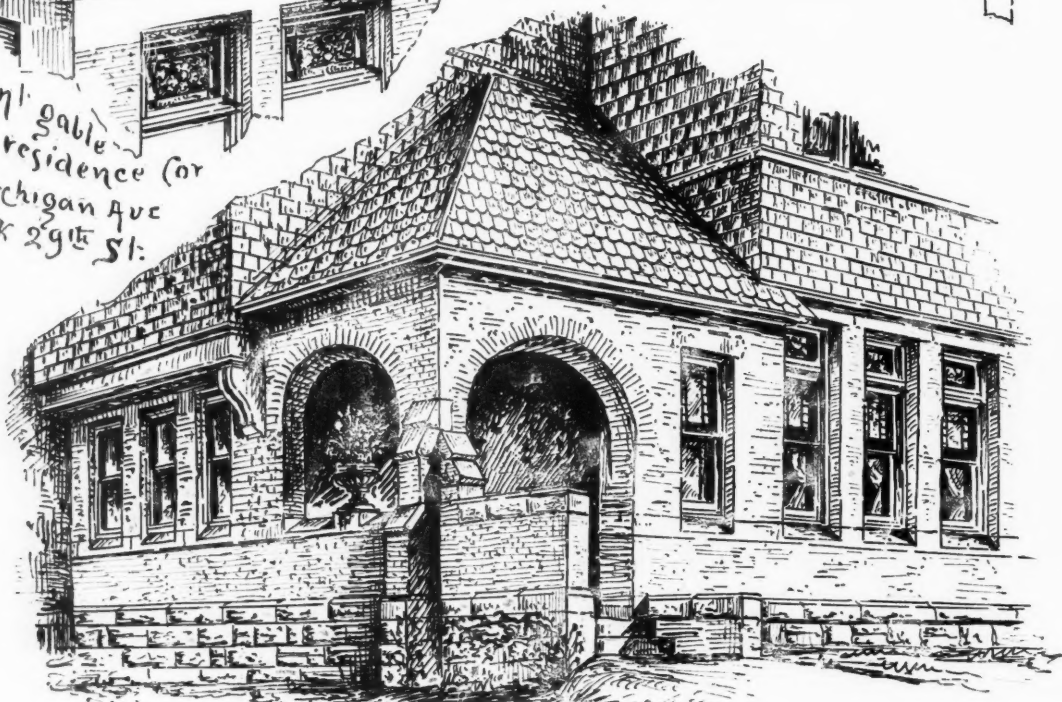
Sketches
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Architectural
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in Chicago
by
J. H. CARPENTER.



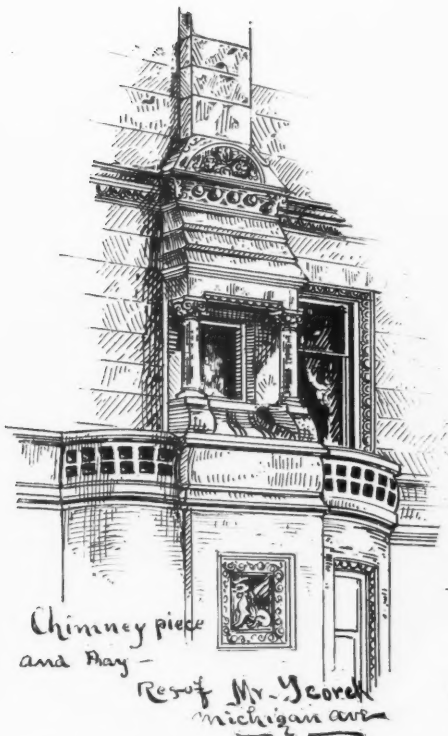
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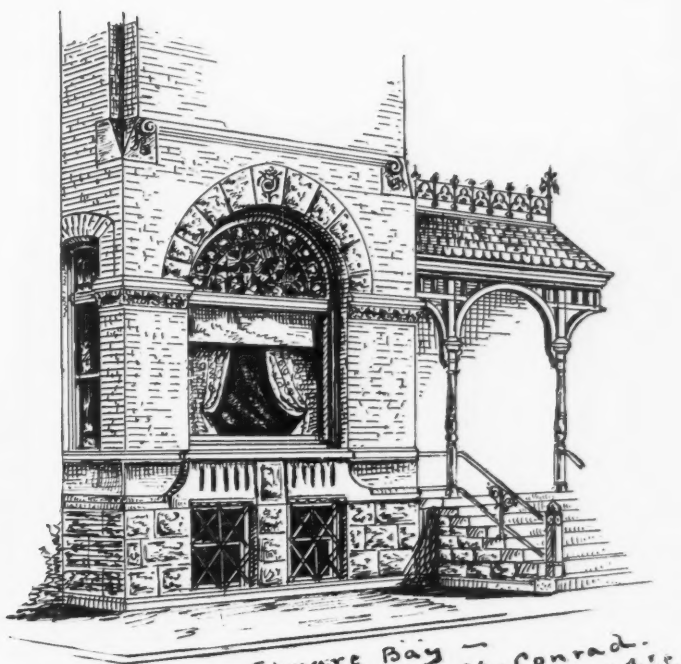
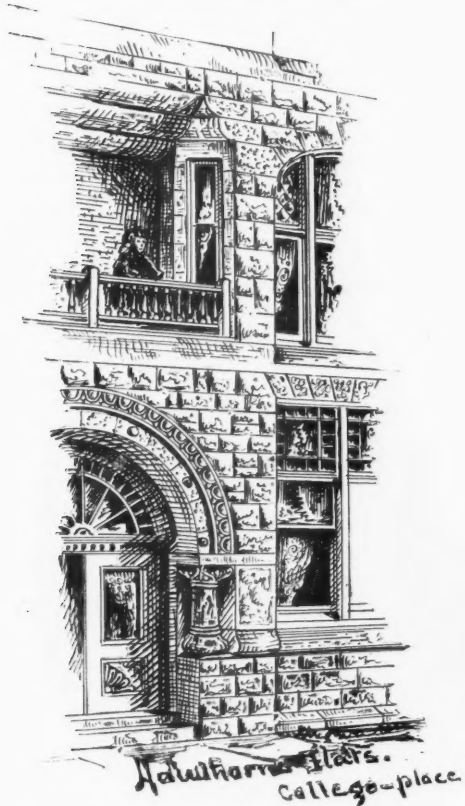
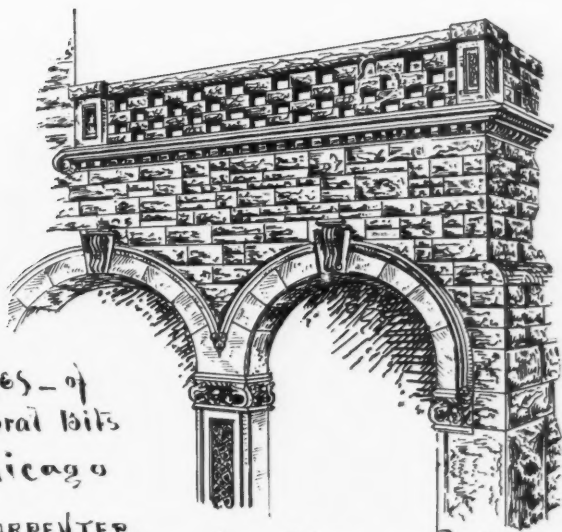
Gable over
Entrance
to
Residence
of
Mr Byran
on
Michigan Ave

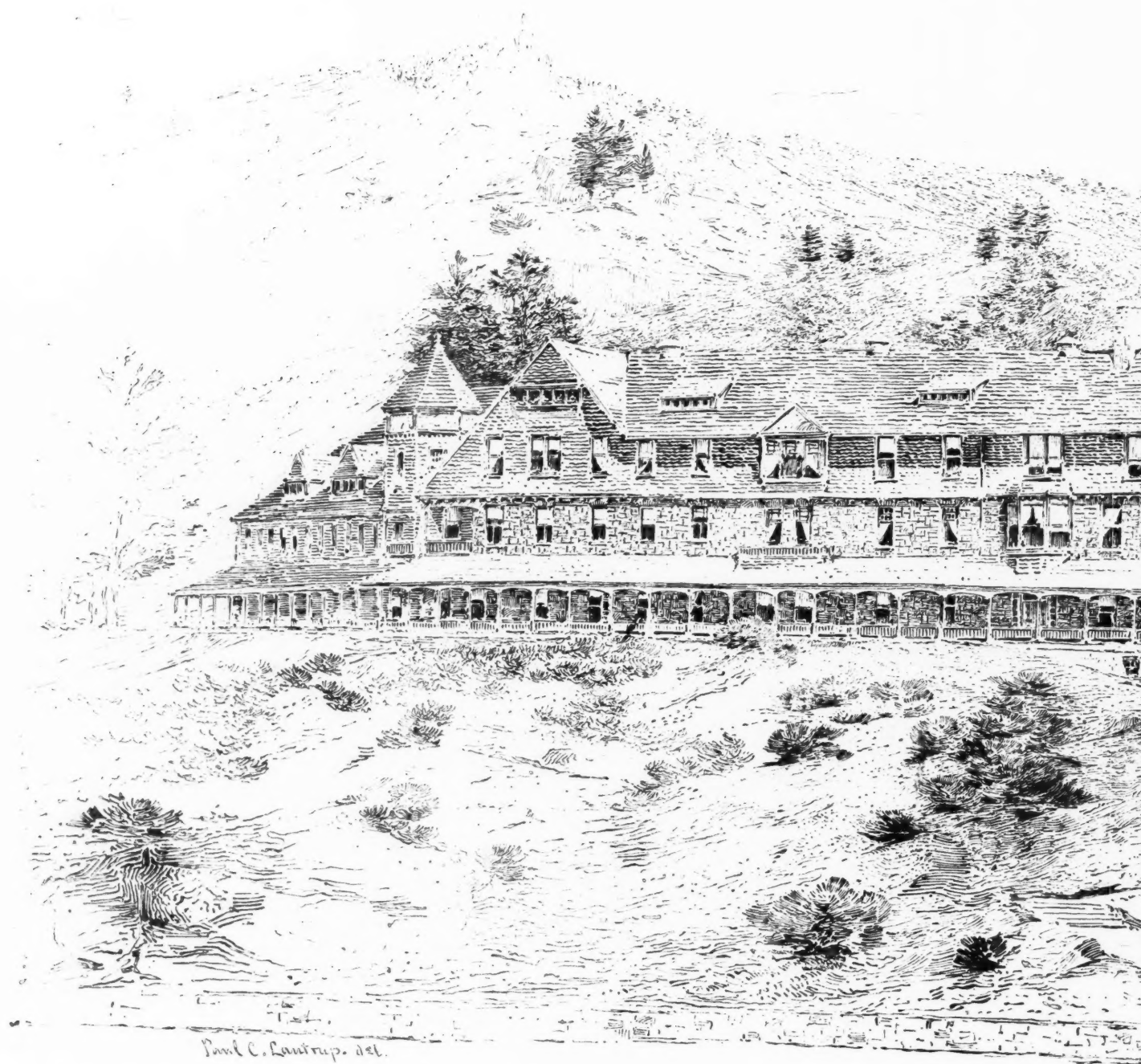


Entrance Porch
To residence of Mr Vose

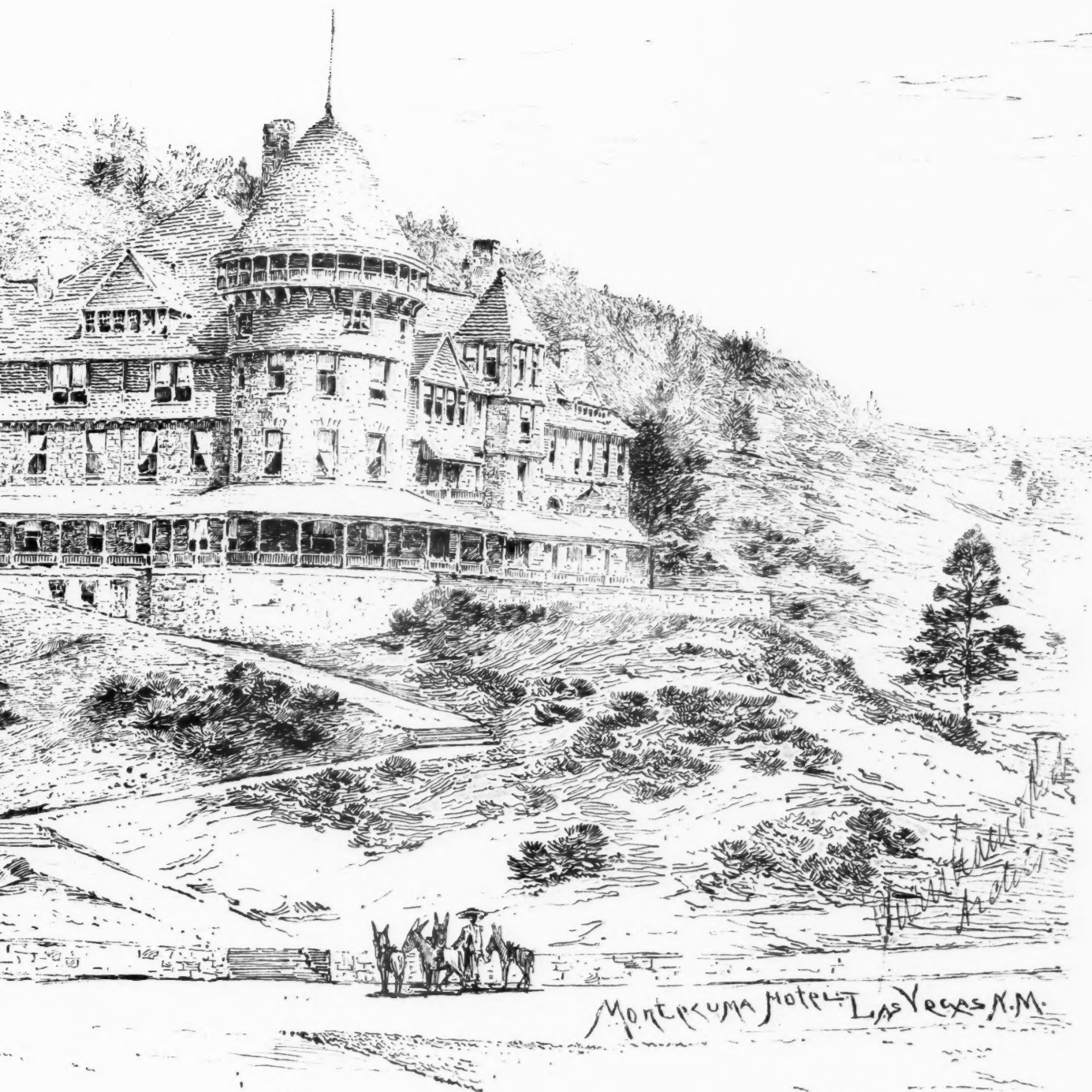


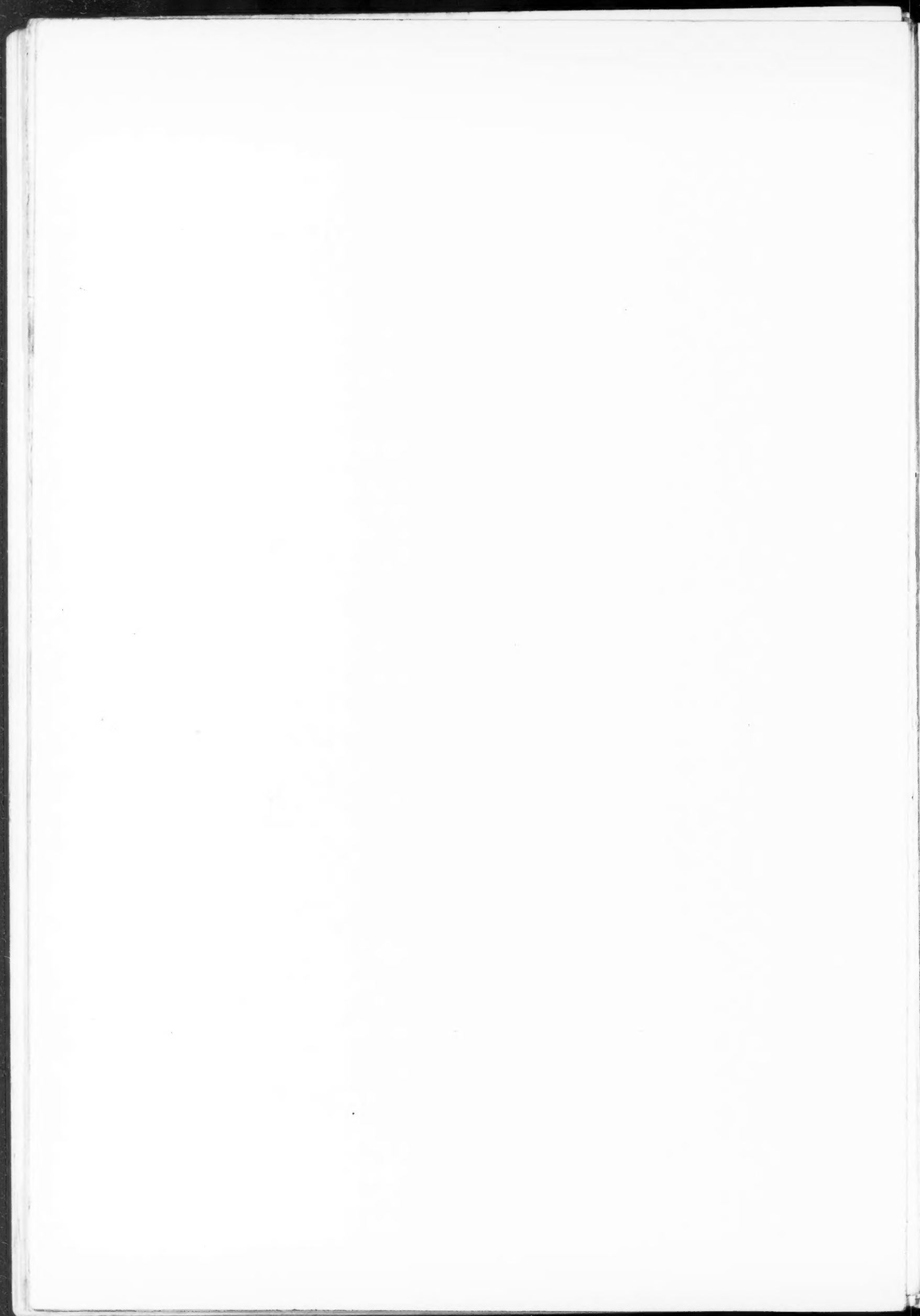
Sketches - of
Architectural bits
in - Chicago
by J. H. CARPENTER.





Paul C. Lautrup. del.





burned district, and all but one were more or less destroyed. The exceptional one was not completed and not dangerously exposed. I have been told that these are not fair illustrations, because in a "general fire," where no water can be used, everything is expected to go down. In reply to this let us see what tendency the investment of capital has taken in Chicago since that time. The year after the great fire one *incombustible* building was entirely rebuilt on the old plan mainly, two were about half rebuilt on the old plan, and two new ones were erected. Five years later the incombustible jail and new court house were built. Nothing further of the kind was done until the improved methods of fireproofing were introduced four years ago, since which time there have been commenced, completed and are in process of construction, eighteen *fireproof* buildings, costing from \$100,000 to \$1,700,000 each. Nine of these are to be completed simultaneously May 1, 1885, all of which goes to show that Chicago capitalists saw the faults of old methods, and waited until they could see their way clear to erect really fireproof buildings. They would not build until they learned how to do it so that their property might withstand a general conflagration. That, however, is not to be apprehended again, for the closely built business part of the city, with heavy party walls, is more secure against the extension of fire now than any other in the country, Boston perhaps excepted.

I am told that office buildings never burn. But the Grannis Block, the best in Chicago of those not professing to be fireproof, was destroyed last winter before the close of business hours, and the origin of the fire is involved in mystery. It was first discovered by the architect of the building, who saw fire coming into his own office, but whence it came no one knew, though there were people all over the building at the time. The United Bank Building, corner of Broadway and Wall street, New York, an incombustible building, which is built with iron-floor beams, plaster block ceilings (which had been put up to replace plaster block arches) and plaster block partitions, narrowly escaped destruction from a fire two years ago, which burned through two floors and destroyed several rooms. My information is from the captain of one of the three steam fire engines that worked at the fire. The ordinary office furniture, which was all the rooms contained, was not fairly burned up, yet partitions and ceilings fell wherever there was fire. This does not show that the fire was not hot. It was intensely hot though of short duration, but the fireproof work should have been such as to withstand it. I am informed that the insurance rate on it has since been raised to the same as if no iron beams or so-called fireproofing had been used.

The patent office building is not only a museum of inventions, but an illustration of all the developments of fire resisting construction from its infancy to the present time. The original part, or north wing, was a vaulted building with a wooden roof and made no pretense to being fireproof. The north and west wings were built according to the more modern or incombustible system. The upper story and roof of these wings were totally destroyed by fire with all the contents. The roof was constructed of iron, with covering of wooden boards and copper above. The fire commenced in the roof at midday, when the building was full of people. The model cases comprised all the furniture, yet the roof communicated fire to them, and the heat was so great that the marble pilasters were absolutely consumed and the red brick walls were melted to a depth of two inches in some places. I only mention this, of which I was a witness, to show how hot the fire was. It is not in place here to speak further of this building than to say that under the able direction of Architects Cluss & Schulze, of Washington, the burned portions have since been rebuilt in a much superior manner, and the old south wing just reconstructed by the same architects embodies the latest improvements in the fireproofing art known up to the present time.

There are extremists in everything; and while in these utterances I may be in danger of being classed with them, I desire to say that the only expressions of opinion on our side of the question that we have are from the real extremists, who, on the occasions of calamitous fires, fill the papers with letters to the effect that "after all there are no fireproof buildings; all such are only approximately fireproof, and it is only a question of time when they will be destroyed." They assume that it is a hopeless problem, not solvable. But if reference is thereby made only to the class of buildings which are merely *incombustible* in their structural parts I agree with them. In a paper prepared some years ago for the New York Association of Supervising and Adjusting Insurance Agents I attempted to describe two classes of buildings which can be built fireproof. There are many of both kinds, of recent construction, now in existence in Chicago, New York and elsewhere, and it is the object of this article to show how they differ from the simply incombustible buildings of which the city of New York, more than any other, contains such a great number. It is hoped that they will make evident the fallacies of the letter-writing extremists, and will demonstrate that the word fireproofing is not a misnomer.

As has been said, there are nine fireproof buildings now in course of completion, and all to be finished by the first of May. All will be finished except one, and that will be occupied on the first four floors even if not completed above. They are the new Board of Trade, the Home Insurance building, the Royal Insurance building, the Opera House block, the Gaff building, the Mallers building, the Insurance Exchange, the Traders' building and the Parker building.

In all but three pressed brick is used for all the exterior walls; in one, the Royal Insurance, which fronts on two adjacent streets, one front is pressed brick and the other is red granite. One, the Parker block, has a sandstone front, while one, the Board of Trade, is faced with granite on three fronts, the rear wall being faced with enameled bricks. So it will be seen that brick and terra-cotta have been mainly used for the exteriors of these buildings, and the risk of damage by fire from without has been reduced to the minimum. But it is in the interior construction that the most important features appear. All are built without brick partition walls except such as are absolutely necessary for their construction. All have their floors supported on plain constructive iron columns without ornament and of sufficient size to carry their respective loads. All have wrought-iron girders, and all except one are at least nine stories high. The first six have rolled-iron floor and roof joists, and the last three have wooden floor and roof joists. This is the main point of departure and divides them into two classes. But in one other respect they are similar in that all partitions are of hollow tiles ranging from three and a half to six inches in thickness. This is to avoid weight upon foundations and to economize the ground room. In one, the Home Insurance, the iron construction of the interior is carried out to the exterior walls, and every pier contains an iron post, which is secured on each story to the whole system of girder construction, and it thereby becomes an iron structure complete in itself, masked by an exterior brick wall.

In everyone of these buildings each iron column and girder is incased in some kind of terra-cotta or fire-clay material for its protection against fire. All the columns are artistically finished in plaster, Keene's cement, or polished Scagliola and all the girders are finished in plaster on the fireproofing material. All the buildings having I-beam floors are constructed with flat, hollow tile arches, so laid as to make continuous tile ceilings below the bottoms of the beams, no beams showing where the centering is removed. All those having wooden floor joists have suspended flat, hollow tile, continuous ceilings attached to the bottoms of the floor joists and extending the brick walls all around. These ceilings are plastered before the partitions are set, and have double floors above with 1 1/4 inches of deafening between. The nine buildings are the work of seven architects, or firms of architects, all residing in Chicago. They are all built in acknowledgment of the fact that cast and wrought-iron, which receive the condemnation of so many thoughtless critics for want of knowing how to use them to best advantage, are still the most valuable of all constructive materials for interiors; that all constructive iron work in a building, howsoever or wheresoever used, must be protected thoroughly and unmistakably from the action of fire; that all partitions and subdivisions must be as thin and light as possible, and that the only material to be used for this purpose is the product of clay, either in the form of hollow, well-burned fire-clay or its superior for all purposes of covering columns, girders, rooftrusses and isolated constructions, porous terra-cotta. No blocks or materials containing plaster have been used in these buildings. Plastering used in its legitimate place for the coating and finishing of the interiors and applied to the fireproof protecting material, becomes a valuable assistant in resisting the first attack of fire, and in such use only. It is better in such cases that no plaster of Paris should be used, as lime and sand are better resisters of fire and water than any other plastic material.

The main divergence in the systems of fireproofing is between the buildings having iron beams and those having wooden joists. It will be seen that the latter use wood only for one purpose, to resist the transverse strain of the floors between the main supports, for all girders are of iron. The principle on which the tile ceilings are laid is that they must be continuous from wall to wall, and all pipes or openings through floors must be cased around with the same fireproof material. The floor joists are all treated as one and the ceilings are continuous sheets of fireproofing, which must not be broken, or the whole integrity of a floor might be in danger. As long as this is preserved such a building will resist fire as severe and as long as one in which the I-beam and tile arch are used, and there is no reason why it should not be called a fireproof building. It is far safer than one in which the iron is exposed, though built throughout of incombustible materials. Ceilings under wooden joists made of plates of porous terra-cotta, secured by screws and plates to the joists, as used in the store of Martin Ryerson, Esq., Chicago, and the American Bank Note Co., N. Y., are better non-conductors than solid tile, and will resist heat better than any other construction that has ever been employed.

(To be continued.)

Architectural Ornamentation.

BY JOHN W. ROOT, ARCHITECT.

SO much has been written and said about architecture and architectural decoration that it seems hopeless to expect anything new, and yet it is true that very few critiques upon these subjects are satisfactory. They are often too technical in vocabulary for laymen, and not sufficiently technical in substance for architects. Or, if this be not true of them, they are deficient in interest by the general absence of critical qualification in the writers. Architectural critics are of two large classes. First, are those who, being conscious of certain natural taste, assume this to be sufficient for all the uses of a prophet and apostle, as was a divine inspiration. Of this class are the vast numbers of Clarence Cooks and Van Rensselaers, and all such mere word-mongers. Then there is a class of really educated critics, like Ferguson, whose whole canon of criticism is to be found in an architectural history. With these men, a good or bad building is known by its conformity to certain conditions, or certain rules, laid down by acknowledged theory-builders of remote ages.

Both taste and learning are, of course, necessary to a good critic in architectural as well as other matters, but after all possible has been said and written by the best equipped of lay critics, something new can be added by the active practitioner, because of the difference in his point of view. The habit of analysis necessary for him to do this is one most desirable for him to cultivate, for it may be assumed, without fear of contradiction, that the commonest cause of that mental ossification among architects, that hopeless crystallization of style, is their failure to constantly refer all they do to the inherent reason of things. Ideally, the creator of any design ought to be able to assign a valid reason for every feature in it, and if the reason is not better than a matter of feeling or sentiment, he may well doubt the merit of the feature. The random application of ornament of all sorts, without thought or purpose, is the crying evil of modern architecture. In briefly pursuing the subject, let us, for convenience, first consider such decoration as consists in lines and masses, and afterward, briefly, the matter of color and combination of material, always confining ourselves to exterior decoration.

In those elements of a building which are involved in its mere stability and permanence, there is a stress of such practical sort that it is not easily escaped; and for this reason, in the essentially structural elements of a design, there is not apt to be such illogical confusion as in purely decorative features. The confusion is greatest in the use of structural features to serve the purpose of decorative, or decorative features, to perform the functions of structural, and also in the mere misapplication of essentially decorative features. As to the first class of sins the crime is greater than the latter, and the enormity of the evil is to be estimated by the violence of the transition. To illustrate this point, it is obvious that if a column is primarily a structural feature, and decorative only in its subordinate relations, it may be legitimate to use the column in a very small scale as a purely decorative detail, but it is the greatest of architectural crimes to use a great column in a large building for any purpose than primarily to carry weight. Still further, it may be entirely proper to use such a decorative form as a loose spiral for a small bracket, or console, where it is manifestly improper to use it for a large bracket carrying great superincumbent weight. So, in this connection, with purely foliated forms. A cluster of delicate leaves may suffice for a boss or capital, carrying but a trifling load; but in a greater scale the leaves, if used at all, must only partially cover the inner mass, which not only does, but seems to do the work. Admirable instances of this may be seen in the different treatment of capitals, large and small, in the cathedral of the type of Amiens, Chartres and Notre Dame de Paris.

Paucity of ideas, or indolence, may often tempt architects into jugglery between structural and decorative forms, but the jugglery is either a peccadillo or a crime and ranks either with the fooleries of Boccaccio or the deviltries of the Terreur Rouge.

Passing from this most hasty consideration of such faults, let us look at the purely decorative elements of architectural design.

To rightly understand and to well use any sort of architectural decoration it is absolutely essential that one should comprehend the purposes of decoration—its capacities and limitations for expressing degrees of thought, together with its inherent character lying back of all historical styles.

And here it must be said that in mastering these points nothing can take the place of a study of natural methods, for it will always be found that for any given conditions in the decoration of a building, parallel conditions exist in nature, and we have only to differentiate from one to the other.

As to the purpose of decoration it is, first, subordinate. It should never be applied so as to conceal the outline and intent of more elementary and essential features. It can never take the place of the vital parts of the structure. It may cover them, but it must follow the form in which they

best do their work, and this with a faithfulness exactly proportioned to the gravity of the work they have to do. Decoration being thus subordinate and non-essential becomes a politeness, and as such is intended "first to avoid offense, and then confer pleasure." For these reasons, in designing it, due consideration must be had to the attitude of the persons to whom it is intended to appeal. It is as absurd to decorate with intricate ornament commercial structures on busy streets, as to approach a man at the corner of Madison and State streets and begin to talk of the last poem by Austin Dobson. And the absurdity does not end with the failure to attract attention; the ornament so neglected becomes dead by virtue of such neglect, and we become like street vendors, who, by constant crying in unheeding ears, stifle their own voices. In architectural vocabulary that speech is best which best addresses the mood of the person spoken to. Vigorous, sententious, trenchant to the busy. Graceful, trivial, sentimental, prolix to the idle. I doubt if any fault committed by architects is more severely visited upon them than this. By it the best things he has are emasculated before they have had a chance to bear fruit. I do not mean by this that in the decoration of commercial buildings coarse and brutal ornament should be used, for the most perfect finish can characterize the most vigorous performance. All that is insisted upon is that we should not ask people to do what they will not do, and so stultify ourselves and harden them.

Another result of this view of decoration is that it should be applied as added accent to special features, calling attention to them and to them alone. A building cannot be over-decorated, so Ruskin has truly said, but it can be badly decorated with most beautiful ornament by having this ornament uniformly applied. Not only does the repose of a design demand that ornament shall be applied with accent and a sense of rhythm, but stretches of undecorated surface are essential to the value of such ornament as may be used. Here, again, we note the difference between large commercial structures and such as occupy less busy parts of the town. A small house may be literally incrustated with ornament like a jewel case, or even in a great building an effect of repose is sometimes obtained by such wealth of ornament that each detail of it goes for nothing as against the general effect. Still, the principle holds good, for in every such case the value obtained by accent and rhythm is produced by changing the scale or type of ornament in those portions designed to be specially noted; in which case the special feature stands out from the others, as in an orchestral work a florid motive for horns may be sustained on a still more florid but steadily rhythmic arabesque of strings. In the maintenance of this accent consideration must be had to the type of building. Sometimes, in a large building, great masses of ornament can be placed at equal intervals, producing a cadence almost Homeric. Sometimes, beneath this major rhythm a minor rhythm may be placed. Generally speaking, however, it will be found that simplest arrangements, not only of the features ornamented, but of the ornament itself, are best fitted to great buildings, and more intricate and involved ornament best suited to smaller ones. To this use of ornament in great and small buildings there are several qualifications, for it is obvious that a large building may possess such inherent intention, or be so located as to largely modify the character of its decorations, and, on the other hand, a small building may have a seriousness of purpose and a dignity of position demanding grave and simple treatment. A further following of this idea will show us that it may occasionally happen that a building will be so situated or constructed that there are but few opportunities for ornament, possibly but one. In such cases the rarer the decoration the more important in itself, and an architect who might give slight thought to each of the hundred masses of ornament must work most wisely when he can use but one.

Now, as to the capacities and limitations of decorations. It is true that each detail in a building goes for little with the general public, and that they are more impressed by the use of certain materials, by the general arrangement of masses, by the effect of lightness or solidity, and by the mere quantity rather than the quality of ornament. This is true, not only because of the indifference of people to the details of architecture and their lack of leisure to examine the minutiae of decorative treatment, but more because through the medium of such decorations as architects have designed he public is spoken to with such uncertain voice. There is no reason why every smallest ornament of the building should not tend toward a predetermined result, and buildings constructed and decorated to be as homogeneous in expression and absolute in type as the organic creations of nature. But apart from the homogeneity of structure, there should certainly be unity of decoration, whereas it generally happens even where architects have fairly well succeeded in carrying out their structural theory, they proceed to give the lie to it by their decorative accessories. Much of this proceeds from failure to analyze the meaning of such forms as supply the motives of decorative design. These forms are not conventionally but inherently graceful or vigorous, exuberant or tenacious, buoyant or ponderous.

No form is so prevalent in architectural decoration as the growth under

resistance—the spiral. Using this form, as illustrating the inherent expressiveness of ornament rightly used, we note that in it are implied the operation of two forces: first, the vitality tending toward a vertical growth, constantly and uniformly exerted; and second, a downward pressure of the weight either of the plant itself or of a superincumbent burden. These being the conditions, it is evident that the character of expression involved in any spiral line will depend upon which of these two forces predominates, and to what extent. Thus, a weak spiral line is one ascending to its highest point, deflected from a right line only by its own weight, meeting here the resistance of an added burden swiftly turning down beneath it and ceasing, as if it abandoned its effort to ascend. This form is well shown in the fuchsia. Reverse it and it loses its characteristic weakness, and under certain conditions becomes expressive of great strength, as if yielding reluctantly to the down pressure of a resistless force, and when free swiftly shooting up again. Another spiral form of great strength is where the line from its first point of yielding returns many times within itself, as in the Ionic volute. This form is expressive, because it yields once only to return again, showing exuberant resistance, and because, moreover, its density of line not only seems to, but actually does tend to resist outside pressure. See how well the Romans of the Augustan age understood this line, as shown in their acanthus scrolls. A thousand illustrations of this principle could be given, but the most casual study of nature will show them. It will always be safe to endeavor to produce in architectural decoration an effect observed in nature by the identical means nature uses to produce this effect. Who that has seen the interlaced and tangled stems of a vigorous Virginia creeper and has tried to part them, does not know why much Romanesque and Byzantine ornament was at once so graceful and powerful?

Decoration being thus expressive has also its limitation. Of itself it has no exterior function. It gains its vitality, like the mistletoe, by adhering to a self-supporting structure. It is, unlike the mistletoe, in no sense to be considered apart from this structure. It is alive and expressive when it is modified by the constructive type of the building. It is dead and irrelevant when separated from this type.

What has been said of the expressiveness of ornament leads to the question of style. I do not think that style, as ordinarily understood, means much. What was done by the creators of these styles, in the long history of architecture, is to be estimated by the same tests as those we should apply to modern work, and must stand or fall by them. Everything in a given style that tended to give it fuller and more homogeneous expression is good. Everything adventitious is bad. The more historical fact that in a certain year certain combinations of certain forms prevail, is in itself valuable to us only as a matter of history. We must go back of this fact. We must inquire if the "style" is a good structural expression of its avowed theory of construction, and if its decorative features carry to still further and finer completeness the same theory. We must especially beware of the servile imitation of those greatest and completest styles that mark the end of long periods of architectural development. To the use of these we have no right unless we shall have realized in our own mind the series of transitions by which the style was evolved. For this reason it will often be found that the study of a transitional period, as such, is much more suggestive than a study of a completed style.

Unity of design we must have. But the unity must spring from within the structure, not without it. The great styles of architecture are of infinite value but they are to be vitally imitated, not servilely copied. Continually return to nature and nature's methods.

From nature we may also draw suggestive lessons in the decorative use of color. In this direction we have a number of suggestions which as yet it does not seem possible to follow, but many are so full of meaning that they touch all we have to do. Among these none is more pertinent than this: that all things in nature tend as they become greater toward monochrome. It is the small things which are polychromatic. So obvious a law is certainly a thing that we should follow in our building. In small dwellings we may legitimately use several colors, sometimes strongly contrasted, but in large buildings the use of several colors should be less violent, so that while the general tone may be as deep and full as we can make it, the variations of color are subtle and are obtained through gradations instead of contrasts. I am aware that many instances can be quoted against this statement. Yet, in every one of those great parti-colored buildings of the world, which have won the admiration of men, the various colors are used in such relatively small masses that, as with the most richly carved buildings, the result is repose. Probably no higher art exists than this, to produce in a great building that wonderful bloom obtained by mosaics of pure color. But this is very different from the unrestful and spotted look which is given a great sweep of street front, when the general tone is continually broken in upon by sharply contrasted masses of different color. Another natural and suggestive principle is that nothing in nature is colored along the lines of its form. The color being always

entirely distinct and being in general characterized in its application by entire absence of definite outline. This natural treatment is possible in the exterior of houses, only when we begin to follow the Venetians and Florentines in their use of incrustations of marble or other richly colored material, cut up into small masses, or having the requisite diversity of small masses of color within itself, but this happy time seems remote.

The color effect produced in a building should be studied from the plane of climatic influences. In Chicago colors should be used which are least injured by the inevitable accretions of smoke. What are best and what worst in this respect can be easily determined by overlaying any doubtful color with a thin glaze of asphaltum. This will indicate the superiority of warm over cold colors.

The length of this paper precludes our devoting more than a few moments to such parts of the subject of decoration as might be further suggested, and hence but a short space will be given to the use of materials. Note, however, in this connection, that there should be no whimsical use of various materials in any building. Their decorative, as well as structural value depends on the thoughtfulness of their use. If the subordinate material of a building be of a stronger and more enduring nature than the general mass, it should always appear in the design at places where the greatest strength is needed. If the subordinate material be weaker than the general mass, it should be used where strength is not necessary. If bond stones be necessary to strengthen the lower piers of a building, and are omitted in a higher story, as if no longer needful, their sudden re-appearance at the top of the building is, from a decorative standpoint, bad. Likewise, from the same standpoint alone, galvanized iron does not form a good corbel to support a cutstone oriel window. I think it will be found upon a careful study of the most successful buildings of the world, as well as the most impressive natural creations, that there is in every building an effect of power produced by the use of a single material, as against the combinations of many. I know of no exceptions to this, except buildings of the type prevalent in Venice, Florence and other Italian cities, where the overlying crust of marble makes no pretense to be the structure of the building. But wherever the surface of the building is its visible wall construction, it certainly becomes more difficult for the architect to express the fullest dignity with several materials, than with one. No general principle can be laid down in this respect, however, and it can only be said that the greatest works of great architects must be studied with nature for a handbook; and the greatest works of nature be analyzed by us with great architects for guides.

The Development of House Warming.

BY BENNEZETTE WILLIAMS, C.E.

TO properly appreciate the progress made by modern civilization in the matter of house warming, we must remember that there is no record of a chimney having been used in Europe longer than 550 years ago, and that their first introduction into England was some 500 years ago, during the reign of Richard II.

Previous to that time our Saxon ancestors, like the red man of America, built a fire on a hearth in the middle of the floor, and provided an opening for the escape of smoke in the roof.

Stoves were the next step in the evolution of house warming.

The use of steam was proposed by Col. William Cook in 1745, and by Sir Hugh Platt previous to that time. But its practical application to heating purposes, was first made by the inventor Watt, in the winter of 1784-85, just 100 years ago. He it was also who made its first successful application to the production of power by the steam engine.

A few years after this we find several others making use of steam as a heating medium, some taking out patents on devices for its application.

Hot water seems to have been first used for house warming in 1817, though application of it to an incubator had been made by a Frenchman, M. Bonnemain, in 1777, and it had been used in Rome before the Christian era for heating baths. Except the limited application of illuminating gas, steam and hot water are the latest, as they are the most approved methods in vogue.

The great drawback to the general use of steam and hot water for heating purposes, for some sixty years after Watt's experiments, seems to have been from the lack of suitable pipes for their distribution. Cast iron, while doing fairly well for hot water, was ill adapted to steam, while copper pipes were too expensive. Thus we see hot water being generally used previous to 1840.

Success in the manufacture of wrought iron welded tubes gave a new impetus to the use of steam, particularly in the United States, where, through the efforts of Joseph Nason, we find the system introduced, and by the aid of his brother-in-law, J. J. Walworth, brought to a marked degree of excellence during the first twenty years following 1840.

Mr. Nason is said to have been the first person to employ the tapering screw thread joint for wrought iron pipes. By the labors of these pioneers

—Nason and Walworth—the Walworth Manufacturing Company early became the leading steam-heating company of the country. The steam-heating business soon assumed vast proportions, while the use of hot water as a medium for distributing heat became largely obsolete, even for those situations where it was doubtless better adapted for the purpose than steam.

The attention of those engaged in heating being thus directed to the perfection of the steam apparatus, while the hot water apparatus received comparatively little attention, has placed the latter at a great disadvantage in a comparison of merits.

The hot water apparatus, however, owing to the great uniformity of temperature it is able to maintain under irregularity of combustion in the furnace, is much better fitted than steam for use in private houses and other like situations, where constant attention to the fires cannot be secured. It is also somewhat more economical in its operation, and safer because of its freedom from danger of explosions.

Steam, on the other hand, is cheaper in the first cost and is more easily distributed throughout large and complicated buildings, and where the generator can have constant attention, it is to be preferred to water.

It would be foreign to the purposes of this article to undertake a description of the various steam generators, and methods of distribution that have been adopted, or of the numerous variety of detail devices, such as valves, traps, radiators, etc., that have been used as appendages to steam plants. Neither is it intended to enter generally into the laws and principles which underlie the successful application of steam to heating, these things being well understood by all competent persons engaged in the business of designing and constructing steam plants. The desire is to discover, if possible, the deficiencies that exist in every-day practice, and the causes thereof, and to point out where their remedy lies, and along what paths future improvements are to be looked for.

To say that there has been no advance in the manner of applying steam since the Walworth Manufacturing Company attained its first successes, would not be exactly true, though it probably is true that there is a vast amount of work done at this day, which is inferior to the best of that done then; and it may well be a question whether the average quality of the work being done now is much, if any, superior to that of twenty-five years ago.

Such can be truthfully said of scarcely any other branch of engineering. It is not true of architecture. Then why should it be true of steam heating?

Considered as a mere generator and distributor of heat, the best steam plants in use are on the whole successful, and leave little to be desired. It is the relation which the plant bears to its surroundings—its adaptability to its environment, so to speak—that is most open to criticism. Such a plant will take up the heat from the burning coal in the furnace, and through the medium of water and steam convey it to any point desired, and give it off with facility, and a good degree of economy. But in this operation it has acted purely as a self-contained automaton, and not as an intelligent being, reaching out to appropriate to itself the wastage of its spendthrift neighbors.

If one of the largest and best fitted buildings in Chicago be taken as an example, it will be found, on an investigation, at any time from October 15 to April 15, that there are probably four hydraulic elevators running constantly during office hours, the motive power for which is obtained by high pressure pumps, pumping water to the top of the building, these pumps using fully thirty thousand pounds of steam per day. In addition to this there are a number of small pumps—water supply pumps, feed pumps, etc.—all using a considerable amount of steam. There are also high pressure electric light engines, using say ten thousand pounds of steam per day, or in all say forty thousand of steam used for various mechanical purposes. This steam, on its discharge into the exhaust pipes, will have lost not to exceed ten per cent of the heat it had on leaving the boilers, the remaining ninety per cent, or say thirty-six thousand pounds of steam being lost every day.

For six months of the year while this is going on, there is from three to four times as much live steam being condensed in the system of pipes and radiators for heating the building; this system of pipes and radiators forming a large condensing apparatus, which should be turned to account to condense, and thereby utilize the steam ordinarily wasted.

Allowing an evaporation of six pounds of water with one pound of Illinois coal, the utilization of thirty-six thousand pounds of steam would represent a saving of three tons of coal per day, which, at three dollars per ton, is nine dollars; for one hundred and fifty days in the year the aggregate amount is \$1,350, which, capitalized at six per cent, gives an equivalent first cost of \$22,500, about two-thirds of the probable cost of the whole steam plant, including boilers, pumps, tanks, etc.

A plant to utilize all the exhaust steam during the period for heating will cost no more than one that wastes it. Though the engine and pump cylinders will have to be slightly larger, or the boilers will have to carry a higher pressure of steam, it makes it possible to dispense with at least one large boiler. And, notwithstanding some increase of radiating surface, that will be necessary, the saving on one side will generally balance the extra expenditures on the other.

Though there is nothing new in such a plant as the one outlined above—the utilization of exhaust steam being perhaps nearly as old as the history of the business in this country—there are but a very few such in use in Chicago, though in some other cities in the country their use is more general.

It may be said that the study of such economies, and the proper grouping of related parts in a building is no part of the steam heater's business. This would be true if the steam heater, like the most of persons who contribute to the erection and fitting of buildings, acted simply in the capacity of a contractor. Such is not the case, however. As a rule, he exercises the functions of the designing engineer. He is the one that generally prepares the specifications by which contracts are let and the work executed, and in numerous instances he takes the contract under his own specifications, and thus virtually becomes the director, as well as the designer and executor of the work.

Such a system can lead to but one result, supposing human nature to maintain a continuity of purposes under like conditions.

Did the brick and the stone mason, and the iron founder, each for himself respectively, prepare the plans for his particular part of the work, no one would be surprised if they failed to harmonize, or if the building, when completed, should be an expensive, ill-proportioned affair. Indeed, we would be surprised if it were anything else. If, on the other hand, each one should contract to furnish all the work of his particular kind needed for the building, for a lump sum, without restrictions as to quality or quantity of material, he to determine these points for himself as the work progressed, we would not expect the demands of stable construction to be very well filled.

Anomalous as such a proceeding would be, it would not differ greatly from what is continually taking place with regard to the lighting, heating, and furnishing of power for buildings.

So far as explicitness enters into his plans and specifications, the steam heater, in fulfilling his functions of designing engineer, is interested in the direction of increased magnitude of the work; but, so far as inexplicitness enter into them, in his functions as a contractor, he is interested in its decreased magnitude, providing, always, that its magnitude is enough to cause its acceptance. The after expenses which the owner may incur are of no interest to him, hence the use of exhaust steam receives no attention. Neither does it concern the electric light company, which contracts to furnish a given number of lights, including engines, dynamos, and conductors, in the face of sharp competition. So far from being to the interest of the electric light company to use exhaust steam under these conditions, it is positively to their interest not to use it, as by its non-use they can squeeze in a slightly smaller engine. The same is true of the pumps, and so on through the whole catalogue.

There are certain firms in every business who start out to do good, honest work, whether or no, and for a time do so, even under the most adverse circumstances, but, unless they are engaged in some specialty that is protected by patents, and thus freed from the competition of the incompetent and the dishonest, or are protected by a system of contracts and supervision, that compels good work, they will, sooner or later, be compelled to succumb to the inevitable.

Such methods never have had, and never will have, in the long run, but the one result, of a gradual deterioration of the general quality of work done, or a condition of fossilization, which is even worse than deterioration, in that from its greater inertia it is harder to correct.

The difficulty of satisfying two masters in steam-heating, as in everything else, is so apparent that we cannot doubt but that it is as true today as it was eighteen hundred years ago, that we cannot serve God and Mammon.

The direction in which improvements are to be expected in the future, and the things in which reform is necessary in the supply of our large city buildings, with power, water, heat, light and drainage, I believe to be as follows:

1. Better provision should be made, than often is made by the architect in the general plan of the building, to provide room in the most economic manner, for the boilers, engines, pipes, etc. To do this properly, the problem must be studied as a whole, with the needs of each branch of the work, and its relation with other branches constantly before the mind. Enough regard is seldom paid to such matters; it being no uncommon thing to find the place set apart for boilers, engines, etc., insufficient in every respect, being some dark hole, cramped in extent, and so low that it

is impossible to set the boilers so as to secure fairly good combustion and to avoid the production of smoke. Then something is due to the men who are to attend these things day in and day out.

2. Greater simplicity should be had, and will naturally follow a proper course of procedure.

3. More effort should be made to secure the safest boilers that will give high evaporative results. The only way to secure this is to require certain results and to see that they are obtained by carefully conducted experiments.

4. Greater economy should be exercised in the use of steam after it is made. During the heating period no heat should be wasted by being exhausted into the air. At the present time this is the stupidest and the most inexcusable of all wasteful habits.

5. Hot surfaces of pipes, boilers, etc., where the heat is not needed, should be protected from loss of heat by thorough insulation.

6. More care should be given to the proper proportioning of pipes, to the amount and character of the work they have to do. It is a common thing to find a pipe used in conveying live steam from a boiler under high pressure, to a heating system, working through the medium of a reducing valve, under low pressure, as large as if it were a low pressure circulating pipe. Where a six-inch pipe is often used under such conditions, a three-inch or a four-inch one would do better.

Taken together, such savings would in numerous cases, if capitalized, equal the whole expense of the steam plant, pumps, boilers, etc.

7. The relation that heat applied to warming should sustain to ventilation ought to be more generally regarded. Thorough ventilation should be, and can be secured without cold drafts.

8. Some easy and effective method of regulating the amount of heat given off by a radiator, not dependent upon the temperature of the steam in the pipes, is a great desideratum, both for the sake of economy and for the comfort of those occupying the rooms. Well directed efforts have been made in this line. Such a system has been applied to the Royal Insurance building in Chicago, and to a number of buildings in other cities. Should it stand the test of time, under the ordinary conditions of practice, a great step in advance will have been made.

9. In the warming of dwellings more attention should be paid to the proper application of hot water. As has been said, steam is not well adapted to this purpose, while the hot-air furnace is wasteful of heat to the last degree.

As a rule, hot water apparatuses contain an insufficient volume of water to store up the heat while there is a good fire under the boiler, to be given out when the fire becomes low. The ability to do this is the chief merit of hot water, making the water the balance-wheel of the system, by the means of which only can economy and uniformity be secured with irregular attention to the furnace.

The most of hot water apparatuses in the market are also defective in the furnace, it being generally surrounded by a water chamber. This is contrary to the laws of combustion, and makes it difficult to keep a small fire with infrequent attention. Every furnace should be lined with non-conducting brickwork, that a high temperature may be maintained for combustion, and that the fire may be slow to lose its heat when covered.

In order that progress toward the improvements suggested above may be constant, and that there may be a continuous and healthy development in steam heating, and its kindred branches, experience teaches that the present system of irresponsibility and confusion should be changed to one of responsibility and order. This can only be done by contracts let on definite plans and specifications, and carried out under rigid supervision, the relation of each branch of the mechanical work that enters into the building being intelligently considered, and made to harmonize with a general scheme.

Association Notes.

MEETINGS.

WESTERN ASSOCIATION OF ARCHITECTS.—Convention will be held November 11, 1885, at St. Louis, Mo. Regular meeting of directors at Chicago, April 17, at 4 P.M.; August 7, at 4 P.M., and at the Southern Hotel, St. Louis, Mo., November 9 and 10, at 2 P.M.

ILLINOIS STATE ASSOCIATION OF ARCHITECTS meets the first Saturday of every month, at 15 East Washington street, Chicago.

MISSOURI STATE ASSOCIATION OF ARCHITECTS meets at Kansas City on the second Tuesday in January, 1886.

The ARCHITECTURAL ASSOCIATION OF IOWA meets second Wednesday of August next—place decided by the Board of Management.

The ARCHITECTURAL ASSOCIATION OF MINNESOTA meets first Tuesday of the month, at Minneapolis.

The ARCHITECTURAL SKETCH CLUB, of Chicago, meets every alternate Monday; temporary quarters, Builders' & Traders' Exchange.

The WESTERN SOCIETY OF ENGINEERS meets the first and third Tuesday of each month at 4 o'clock P.M., at 15 East Washington street, Chicago.

The MASTER PLUMBERS SOCIETY, of Chicago, meets first and third Wednesdays of the month, 7.30 P.M., at 15 East Washington street.

Average Rents for Office Buildings.

THE question of the ruling rents in other large cities as compared with those which are obtained in Chicago is one of vast importance, both to owners and tenants, and the facts gleaned from our sources of information on this subject will be of special interest at this season. The comparisons made have reference to office buildings of the first class, and strictly fireproof throughout, and to those of less grade—practically fireproof it might be claimed, but in which an unwise parsimony on the part of the owners prevented them from incurring the expense to make them strictly so. New York, as the great emporium of trade and commerce and the leading city of the Union, with about twice the population of Chicago, furnishes the best and the greatest number of examples of fine office buildings. From a gentleman of New York City, thoroughly conversant with the subject and who, in fact, has almost made it a study, it was learned that the average rent per square foot per annum of clear office floorage will not fall below two and a half to three dollars for buildings of the first class. In the upward scale of prices an average cannot be so easily fixed as the conditions are often arbitrary, the tenant in many cases choosing his location before the building has grown above its foundations and causing the construction to be modified in reference to his own quarters to suit the requirements of his special business. The ground or lower floors of this class of buildings are almost always occupied by banking, insurance and kindred lines of business, furnishing a class of tenants amply able to pay for what will suit them and they desire to have. A notable instance of this divergence of prices and the upward end of the scale is furnished in the case of the new United Bank building, on the corner of Broadway and Wall street, where a prominent insurance company pays thirteen dollars and a half per square foot for their elegant offices on the first floor. This is said to be the highest bona fide rent paid for any office room in New York City. Higher rents are in some instances claimed to be paid as in the case of large corporations who erect their own buildings, and for the portion which they occupy charge themselves up with a rental which no other tenants could be found to pay, but this not being strict business practice does not enter into the consideration. The location named is one of the very finest in New York City and is relatively the same as the corner of Dearborn and Monroe streets in Chicago. Rents in this locality range from \$1.25 to \$1.75 per square foot per annum.

A notable structure at the foot of Broadway—the Washington building—might in point of location, commercially considered, be compared to some of the fine buildings within a block of the new Board of Trade building in Chicago. Like them it is in the field of the new departure created by the new Produce Exchange. It is a handsome, well built structure, containing about two hundred and fifty office rooms, ranging from three to five dollars, and in some exceptional cases running as high as eight dollars per square foot per annum. The rents in the neighborhood of the Chicago Board of Trade average about \$1.50 per square foot, though in one fireproof building, the Traders, directly opposite the side entrance to the Board of Trade, the rental averages from \$1.50 to \$2.00.

Another fine building, Temple Court, on the corner of Nassau and Beekman streets, furnishes a good example of how rents range. This building is nine stories, and admirably arranged with regard to light and ventilation. It will about compare with the Montauk block, Chicago, as an office building, though its location is not relatively the same, and might better be placed on the corner of Dearborn and Randolph streets. Its prices range as high as three dollars, but the average for the entire building will not range much, if any, over two dollars per square foot. In the locality named in Chicago the rents for the nine-story Borden block average from \$1.15 to \$1.25 per square foot.

Fronting on Park Row, right opposite the postoffice, and overlooking the grounds surrounding the city hall, stands the Potter building. It has also a frontage on Beekman and on Nassau streets. It is a very fine brick structure, eleven stories in height, and, though not yet quite ready for occupancy, its schedule of prices has been determined upon, and will present a general average for the building of two and a quarter, possibly two and a half dollars, per square foot, the more choice offices running as high as three and a half, and the lowest prices not going below two dollars per square foot per annum. The location is relatively the same as the corner of Clark and Washington streets, Chicago, and the Chicago Opera House and office building, on the corner of these streets, will furnish a fitting comparison as to the building itself. The rent in this building for the upper six floors has been set at a uniform rate of \$1.50, tenants taking space as they require. Below this, there is a slight advance.

These comparisons are approximately correct, and will enable the reader to form some idea of the relative values of office building rentals in Chicago and New York. The great difficulty to be encountered in making such comparisons is found in the fact that in other cities particular streets or localities, devoted to special lines of business, are not so marked and well defined as they are in Chicago. Though this is the case, rentals are often found to widely diverge from the average given, the rental of a small corner for a particular line of business being much in excess, or under the same circumstances, a small rear basement exceeding in rent those in front. As a reliable average, the general average rental in the business portion of Chicago may be placed at from \$1.25 to \$2.00, and that for choice corners, basements and first floors, at \$3.00, though instances are common where as high as \$10 or even \$16 have been offered, which is, of course, exceptional, and for very small choice spaces.

Gustav Hinstorff, of Chicago, is publishing a new form of contracts and specifications for the use of architects. They are of necessity arranged in a general way, suitable for frame and brick buildings, costing from \$500 to \$10,000. Though many architects have a special form of their own these can be recommended for covering all the general purposes, and should meet with favor with the profession. They are sold separate, by the dozen, or quire, and can be readily sent by mail to any part of the country. They are neatly printed and inclosed in a substantial manilla cover. This firm also publish blank certificate books, with stub attached, for the use of architects.

Our Illustrations.

Sketches of architectural bits in Chicago, by J. H. Carpenter.

Episcopal Church of the Epiphany, on Ashland avenue and Adams street, Chicago, by architects Burling & Whitehouse. It will be 119 by 55 feet, and will have a seating capacity of about eight hundred. It will be built of Lake Superior variegated stone, rock faced. It will be Norman-Gothic in style, with high roof, slated, and low side walls. It will cost about \$45,000.

Double residence for Dr. J. R. Elliott, Cincinnati, by architects O. C. Smith and W. R. Forbush. The houses are built on a sixty foot lot, with an arched carriage way, ten feet wide, between. The first story is built of red Mansfield stone. The second story is faced with plaster work; the gables set with broken bottle glass. The finish of the first floor is cherry; the second, yellow pine. Each house will contain seven rooms, with two additional rooms in the attic. Cost, \$10,000 each.

Dwelling and barn for B. L. Pease, at Oak Park, Ills., by architect Alfred Smith, Chicago. The basement is rockfaced stone; the first story Anderson pressed brick trimmed with brownstone, and a tower on corner also of brownstone. The third story is frame construction, finished in California redwood and shingles. This wood is exceptionally well adapted to the finish of timber construction and has a much greater permanency than common pine, beside the natural beauty of the redwood. The interior of the first floor is finished in oak and cherry, the balance in white pine and oil finish. The barn is built on rockfaced stone and frame above. The front is faced with narrow ceiling and cut shingles. The interior is finished in Georgia pine. The cost of house and stable is about \$20,000.

Rosalie Music Hall, perspective and interior details, at Rosalie villas, South Park, Chicago, by architect S. S. Beman. It is 60 by 103 feet on the ground floor, the second projecting three feet on the sides and five feet front and rear. The first story will be of pressed brick; the second, of timber construction and shingles in columnal style. The first story will contain stores, cafe, billiard hall, drug store, etc. The second, reached by a fine oak staircase, will contain the music hall, which will be fitted in a tasteful rather than an elegant manner. The timber construction will be exposed. There will be a foyer and ladies' and gentlemen's waiting rooms under the gallery, and a private reception-room, of sufficient extent for balls, club parties, etc. Private boxes will occupy the gables and a band balcony will be placed at the end opposite the gallery. This music hall is a part of a scheme which includes a tastefully grouped collection of villas, with church, schoolhouse, etc.; in its entirety, one of the most attractive projects for residences yet started in Chicago.

Montezuma Hotel, Las Vegas, New Mexico, Burnham & Root, architects, Chicago. This hotel, which is just completed, stands at the entrance to the canyon Rio Gallinas, six miles from Las Vegas, where the hot springs are located. The hotel is located on the mountain-side, about seventy-five feet above the plateau. The main structure is 98 by 158 feet, and the longest front is about 200 feet, facing down the valley. The exterior walls are of Bradford sandstone, and the partition walls are fireproofed with tiling, giving to the structure a fireproof quality, and a desirable coolness of interior. The interior fittings are as elaborate as those of any hotel in the West, and it has the distinguishing quality of being the only hotel in the United States that is entirely lighted by electricity, there being not even a provision made for the use of gas or lamps. The lighting is accomplished by about seven hundred incandescent lights, fixtures for which being brass and copper. The main dining-room is 60 by 100 feet. This is lighted by two main chandeliers, of twenty-four incandescent lights each, and fourteen side brackets, of three lights each line the sides. The system is that of the United States Electric Light Company placed by the western manager, Mr. C. C. Warren, of Chicago. The plant is operated from an engine and dynamos placed four hundred and fifty feet from the main building, the current being carried by a cable, which is also a noticeable feature, and the extraordinary distance marking the perfection of the company's system. The entire plant is divided into eleven parts, or systems, each of which is controlled separately from a central point in the office, and each light is equipped with a separate attachment to turn the light off and on. The hotel is capable of accommodating five hundred guests, and in architectural effect it is one of the finest conceptions ever executed in hotel designing in this country.

Residence for J. Cudahy, E-q., Michigan avenue and Thirty-third street, Chicago, by Architects Burling and Whitehouse. It will be constructed of Connecticut Long Meadow stone in the Flemish-Gothic style, 66 by 84 feet. There will be three stories, basement, and a high roof, and Belvidere tower on the corner. The porte cochere will be on the north side of the house, and the main entrance will have a massive projecting porch, with dwarf columns supporting a Roman arch which extends upward terminating in a gabled roof. Oriel and turret treatment will be employed on the north corner of the facade, and on the Thirty-third street side the facade will be broken by two projecting stone balconies, with gable above, and a minor round stone tower in the roof. A 20 by 30 feet conservatory will be directly connected with the dining-room, and will be seen through the entrance and main halls from the front door. The main hall will be twenty-nine feet long and twenty-one feet wide, and the main double staircase will lead up from a stairway hall on the north of the main hall. On the second floor, over the main hall, will be a well-hole surrounded by the entrances to the various apartments on that floor leading off from galleries. On the right of the main hall on the first floor is a large drawing-room 20 by 28 feet, and on the left a reception-room, library, parlor, and dining-room. The breakfast-room will be on the northeast corner, and connected with it a private stairway, dumb waiter, butler's pantry, elevator, and vault. On the second floor there will be a nursery department, with bathroom, etc., the family bedrooms, dressing-rooms, and tower boudoir, also three large guest-rooms. The billiard-room and minor rooms will be on the third floor. The billiard-room will be 18 by 30 feet, and a ball-room 27 by 50 feet, with a music gallery in the tower. The entire building will be finished in hardwood. The cost will be about \$125,000.

Mosaics.

The Gleason Wood Ornament Company, of Grand Rapids, Michigan, are making a new departure in the history of wood carving, their product in the line of carved ornaments for panels, etc., having all the appearance of fine wood carving without the expense, the work being done by a stamping process. For an interior finish of moderate cost, this work commends itself to architects and builders generally.

The widow of Mark Hopkins intends to build in Great Barrington the most expensive residence building in the United States. The cost of the house and grounds will be \$5,000,000. The house will be built of blue-stone from the quarry she owns, and the work will begin as soon as spring opens. The work in the quarry will be carried on day and night, electric light being used for the night work. One thousand men will be employed for three years.

An extremely useful adjunct to a well appointed house is the modern dumb-waiter, for conveying food and other light articles to upper floors. Special attention is called to those made by M. B. Swezey, 120 Twentieth street, this city, which are provided with an automatic catch to hold them in position during the loading and unloading process. So superior are they, and so satisfactory have they proved, that many owners multiply them in their houses, and leading architects do not hesitate to strongly recommend them as conveniences that repay the outlay a hundred fold.

AMONG the many monuments to Washington is one which every visitor to the Cape Verd Isles will remember as one of the most colossal and marvelous freaks of natural sculpture in existence. Along the further side of the harbor of San Vicente (the principal town) rises a bold ridge of dark-gray volcanic rock, the crest of which forms an exact likeness of Washington, lying face upward as if in sleep or death. The hero's large, bold features, the backward wave of the hair, the sweep of his massive shoulders, and the very frill of his shirt are all reproduced on a gigantic scale with a fidelity worthy of the stalactite formations of the Adelsberg Grotto or the Mammoth Cave of Kentucky. This strange monument, sharply outlined against the deep, rich blue of the tropical sky, is one of the first objects that meet one's eye on approaching the island, and presents, with the boundless ocean for its appropriate background, a tableau of such overpowering magnificence as might well drive any sculptor to despair.

W. H. SMITH, of Hinsdale, Ills., has recently invented, and now for the first time offers to the public, an hydraulic brick for general purposes, which lays claim to many points of excellence. These bricks are made of crushed slag, sand or broken stone, or any other material mixing well with cement, and are then molded by the concussion of steam-hammers, and require no burning whatever. When made they go through a drying process in the open air, being piled for the purpose, and are ready for use in from eight to ten days. They are heavier than ordinary brick, weighing 160 pounds to the cubic foot, or about the same as limestone. They are smooth, with exceptionally perfect edges, and may be given any desired color or faced upon any side with any color. The colors are produced by mineral paints and are indestructible. Bricks made by this process have been tested, and show, it is said, a crushing strain of 4,000 to 6,000 pounds to the cubic inch. Bricks so made may be handled with no more risk than ordinary brick, and are said to be very durable and proof against crumbling.

THE gas fixtures of the new Board of Trade building are probably the most elaborate and artistic to be seen in any western building. They are from special designs which were furnished by H. G. Willard, the western manager of the Archer & Pancoast Manufacturing Company, of New York, from which the company executed them in antique brass and other metals. There is not an old or stereotyped idea in the entire outfit, covering a contract of many thousands of dollars, and when the vast throng attended the opening promenade concert and the light projected from these marvels of art and was reflected by their metallic luster, their beauty gave pleasure to every eye and their artistic harmony blended perfectly with the elegance that filled the halls and offices. So truly artistic and faithful to the traditions of metal work are these gas-fixture makers that their display gives a constant pleasure to the lover of the unique who visits the Chicago showrooms, a place where each succeeding visit develops some new beauty and gives a new pleasure, while the acquisition of one of these fixtures, selected for its fitness to the place it is to occupy, is always a matter of satisfaction and gives to the owner a work of art as well as something of real financial value.

A PRINTED specification must be as complete as possible in the general stipulations, which must be repeated for every building and by every architect. Printing these saves much drudgery, tiresome routine, and also insures against any accidental omission, which is always possible in written work. Beyond this it cannot well go without causing annoyance by frequent cancellations. The Inland Publishing Co. has secured the publication of a specification form, prepared by an architect of large experience, who has used it (only less complete) in his practice for some six years. This specification is very complete in general items, while avoiding the necessity for much canceling. Besides the above, its peculiar features are the preliminary statement of the relative positions and rights of owner, architect, builder, and sub-contractors, wherein this form aims to forestall disputes and litigation; the list or catalogue of all matters to be treated in the written pages, which is found at the end of each section; the index on the first inside page, which will save time lost in hunting for subjects; and particularly the division into printed and written pages, which enables the printed part to be set up solid, without inter-spaces (which are never exactly right). This reduces, by nearly one-half, the size of the printed specification, and entirely avoids the old difficulty with the inter-spaces, which are a feature of all other prints, and which are too short just as often as they are too long. The cross references forward and backward on each printed and each written page to the continuance of the same subject saves embarrassment. The price is very reasonable. Send orders to the Inland Publishing Co.

Synopsis of Building News.

Cincinnati, O.—The following is reported by the secretary of the Builders' Exchange:

Architect Geo. W. Rapp: Addition to German Protestant Orphan Asylum, 60 by 110 feet, brick, with freestone trimmings, cost \$35,000; under way. For Gambinus Stock Co., new malt-house, 45 by 70 feet, freestone trimmings, cost not estimated; under way.

Architects Smith & Forbush: For Mr. J. Rogers, two-story frame dwelling, slate roof, cost \$2,800; under way. For Mrs. C. Hoffman, two-story frame dwelling, 36 by 38 feet, cost \$3,700. For John H. Frey, two two-story frame houses, 36 by 27 feet, slate roof, bay windows, cost \$7,000; under way. For Frank Schuler, ten-room brick dwelling, cost \$7,000; drawings made. Madisonville Town Hall, 80 by 44 feet, to be built of Madisonville brick, with Middletown brick trimmings, slate roof, cost \$12,000; drawings made.

Architects G. & A. Brink: For John Houck, four stores and flats, 80 by 110 feet, built of pressed brick, cost \$30,000; contract let. For C. Wolff, three-story brick warehouse, 30 by 85 feet, cost \$6,000; contract let. For John Bremferder, two and a half-story brick dwelling, 26 by 80 feet, stone trimmings, tin roof, hardwood finish, cost \$11,000; contract let. For H. B. Eckelmann, six three-story brick dwellings, 18 by 60 feet, cost \$16,000; under way. For John D. Moore, four-story pressed brick front, stores and flats, 40 by 90 feet, cost \$15,000; under way.

Chicago.—The building situation in general is more quiet than has been expected or is usual at this season of the year. This is from several causes, one of which is the scarcity of stone for foundations, the foolishness of the quarry owners at Joliet and Lemont having precipitated a strike that is not yet at an end, though work has been partially resumed under military protection. It is singular that for the first time in years the building trades have been thoroughly free from strikes of any kind, with the exception noted. The yards are full of new brick in the first stages of manufacture, and the prospect is that prices will range low this season for this material. A slight cut in wages may disturb the brickmakers at a later date, though it will be extremely bad policy for the "hoses" to repeat the mistake of the Joliet contractors.

Architect W. W. Boyington reports: For Crane Bros. Mfg. Co., four story and basement factory building, 60 by 90 feet. The building is to be used for heavy machinery. It will be built of brick, with stone trimmings, iron roof, to be erected on Jefferson street, cost about \$40,000. Also several eight-room cottages at Maywood, cost \$2,500 each. For C. S. Robinson at Maywood, alterations in brick residence, cost \$6,000. For Albert Keep, barn 25 by 50 feet, brick with stone trimmings, cost about \$4,500.

The rotunda and offices in the Grand Pacific Hotel are now being frescoed by Wm. Phillipson.

Architects Atchison & Fiedler report: For S. F. Johnson, of New York, three-story and cellar, brick and terra-cotta store and apartment building, 77 by 62 feet, to be erected on the corner of State and 13th street, cost \$24,000; projected. For Robert Bines, four story and basement, brick and terra-cotta, store and apartment building, 50 by 68 feet, to be erected on Dearborn, between Van Buren and Harrison streets, cost \$23,000; projected. For Miss Ella E. Hatch, three stories and cellar, brick and terra-cotta, apartment house on triangular lot, corner of Lincoln avenue and Hurst street, 101 feet on Lincoln avenue, 70 feet on Hurst street, cost \$20,000.

Architect J. J. Flanders reports: Raising, alteration and addition to Western avenue Baptist Church, 36 by 56 by 110 feet, cost \$8,000, under way; work done by the day. For P. O. Stinsland, remodeling of building 235-7 Milwaukee avenue, cost \$10,000. For Jonathan Clark, six-story store building, 80 by 140 feet, on State, south of Jackson street, cost \$60,000; projected.

Architect M. L. Beers reports: For Mrs. Francis De Wolf, at Hyde Park, two-story and cellar and attic residence, 33 by 56 feet. It is to be built of Anderson pressed brick, with ornamental brick and terra-cotta trimmings, interior finished in black brick, red and white oak and Georgia pine, cost \$12,000; under way.

Architects Wilson & Moody report: For W. H. Pruyn, two-story residence, 22 by 60 feet, on Congress, near Loomis street, cost \$3,500; under way. For W. E. Hall, two two-story and cellar dwellings, 33 by 60 feet, on Oakley avenue, near Polk street, cost \$6,000; under way. For E. E. Russell, two-story brick and terra-cotta dwellings, 25 by 60 feet, on Laflin, near Van Buren street, cost \$5,000; under way. For Albert Decurt, four cottages and three two-story houses on 55th street and Washington avenue, cost \$5,000; under way. For C. G. Hutchinson, five two-story flats, 96 by 60 feet, on Arbor Place, cost \$12,000. For John Buckley, brick and stone store building, 21 by 85 feet, at 835 West Madison street, cost \$9,000. For W. L. Davis, two-story and cellar dwelling, 25 by 60 feet, Jackson street, near Western avenue, cost \$4,000.

Clinton, Ia.—The Chicago, Burlington & Quincy, and the Cedar Rapids & Northern Railway Companies have cleared the ground here for their new union passenger and freight depots, to be erected this season. The buildings will be built of brick, with stone trimmings, of ornate architecture. Work on the freight building will be prosecuted at once. The C. B. & Q. began business here January 19th last, having completed bridge traffic negotiations with the C. & N. W. so as to use the latter's bridge connecting with the Mendota branch of the Burlington at East Clinton. The completion about the same time of the Clinton division of the B. C. R. & N. puts Clinton on another direct through route.

The supervisors, April 9, let to A. E. Wright, of this city, for \$7,850, the contract to erect a new county jail and sheriff's residence in the court house square. Plans submitted by Messrs. Parley & Co., of St. Louis, were adopted, and the latter firm are to receive \$9,000 for the plans and system of steel cells for the interior of the jail.

Foundations are laid for two new store buildings, and unusual activity is displayed in the matters of repairs, additions to dwellings, and several new cottages are being built.

Detroit, Mich.—The building outlook is somewhat brighter, and it is probable that a large amount of building will be done this year. The total amount of permits issued during March was 378,665.

Architect Geo. W. Meyers reports: For T. S. Aiken, at Pittsburgh, Pa., two-story dwelling, 46 by 65 feet; brick with stone trimming; cost, \$9,000; projected. For Milo Clark & Sons, at Bronson, Mich., two-story block of stores, 22 by 60 feet; cost, \$4,000; projected. For P. V. Fox, Grand Rapids, Mich., two-story frame dwelling, 40 by 60 feet, slate roof; cost, \$4,500; projected. For W. S. Morea, Flat Rock, Mich., two-story brick and stone dwelling, 35 by 50 feet, slate roof; cost, \$4,500; projected. For Richmond, Mich., town hall, two-story brick, 34 by 60 feet, stone trimmings, tin roof; cost, \$4,000; projected. For Geo. Starr, Coldwater, Mich., two-story block of stores, 22 by 60 feet, brick and stone, gravel roof; cost, \$4,000; projected. For W. Stickney, Rathbunville, N. Y., three-story brick and stone buildings, 60 by 150 feet, tin roof; cost, \$12,000; projected. For G. X. M. Collier, Detroit, two-story brick and stone dwelling, 45 by 65 feet, slate roof; cost, \$8,000; projected. For Chas. King, two-story brick and stone dwelling, 40 by 65 feet, slate roof; cost, \$6,000; projected.

Architects Scott & Co. report: For M. J. Dinan, two-story brick dwelling, 25 by 68 feet; cost, \$5,000; under way. For Peter Thersen, two-story double brick dwelling, 42 by 52 feet, cost \$4,000; under way.

Architect C. B. Cole reports: For C. H. Leonard, three-story brick office building, 36 by 60 feet; under way; Spetzley Bros., builders.

Architects Spier & Rohns report: For Thomas McGregor, two-story double brick dwelling, 45 by 70 feet, cost \$6,200; under way; Lewis Reberg, carpenter; Reich & Gabell, masons.

Architect A. C. Varney reports: For Emil S. Heineman, block of six stories, 147 by 60 feet, four stories high, brick, cost \$40,000; under way; A. Chapant, Jr., builder. For A. S. Wiley, two-story brick and frame dwelling, 27 by 60 feet, cost \$5,000; under way.

Architect H. Engelbert, reports: For N. W. Weber two-story brick dwelling, 60 by 64 feet, stone trimmings, slate roof, cost \$6,000; projected.

Architect E. E. Myers reports: City hall, Grand Rapids, Mich., three-story stone building, 160 by 94 feet, slate roof, cost \$185,700; under way; W. D. Richardson (Springfield, Ill.), builder. At Galesburg, Ill., three-story stone court house, 97 by 123 feet, slate roof, cost \$117,000; under way; Dawson & Anderson (Toledo, Ohio), builders.

Duluth, Minn.—The Union Improvement and Elevator Co. are now driving piles for the foundation of a grain elevator, 96 by 304 feet, annex to their elevator "E," and to be known as elevator "F," capacity 1,300,000 bushels. The Lake Superior Elevator Co. have commenced work on grain elevator, 96 by 352 feet, annex to their elevator "D," and to be known as elevator "G," capacity 1,500,000 bushels; cost \$125,000. Both the above are to be built from plans, and under the supervision of Messrs. J. F. Moulton & Son, architects, of Chicago, Ill., who report, "prospects good for other elevators in Minnesota this season."

Indianapolis, Ind.—Outlook favorable, although the season is somewhat behind.

Architect Chas. G. Mueller reports: For C. Maus, three-story, brick, stone and iron malt house, 40 by 80 feet, cost \$13,000; under way. For the Union Furniture Company, four-story brick, stone and iron factory building, 41 by 92 feet, cost \$10,000. Two-story brick and stone Catholic church building, 56 by 85 feet, at Morris, Ind., cost \$9,000; under way. For C. F. Schmidt, at Danville, Ill., storage house, cost \$3,000; contracted, also, several cottages; under way.

Marshalltown, Iowa.—The outlook for business is not very brilliant, although prices of building material are exceedingly low.

Architect F. M. Ellis reports the following work in hand: High school building at Waukon, Iowa, cost \$20,000; two school buildings at Red Oak, Iowa, cost \$10,000; one school building at Anamosa, Iowa, cost \$10,000; M. E. church at Beatrice, Neb., cost \$20,000; Congregational church at Norfolk, Neb., cost \$10,000; N. A. Rainbolt's residence at Norfolk, Neb., cost \$7,000; opera house at Newton, Iowa, cost \$25,000; opera house at Huron, D. T., cost \$20,000; court house at Alexandria, D. T., cost \$15,000; G. W. Sloan's residence at Peoria, Ill., cost \$18,000; school house at Le Grand, Ia., cost \$2,500; Episcopal church at Marshalltown, Ia., cost \$3,500.

Minneapolis, Minn.—Permits were issued April 23 for the erection of two five-story brownstone front business blocks, containing three stores each, Nos. 19 to 23 and 25 to 29 Fourth street, for R. L. Stillman and W. T. Callum; the formers will cost about \$80,000, and the latters about \$60,000. They will be handsome structures, and will ornament that portion of the city.

Cook & Co.'s new building, to be erected on the corner of Fifth street and Hennepin avenue, will have a frontage of 140 feet on Hennepin and 140 on Fifth; it will be nine stories high, making it the tallest structure in Minneapolis. It is proposed to make the building thoroughly fire-proof. If the project is carried out, as is now expected, the building will cost about \$150,000, and will in all probability surpass any office building in this city.

Permits were issued to the Board of Education, April 9, for two new school houses, to cost \$25,000 each. The plans in each case provide for a three-story, twelve-room brick building, with all modern improvements. Permits have also been issued to the Board for additions to the Franklin school building in North Minneapolis and the Humboldt building in Northeast Minneapolis at a cost of \$10,000 each. It is also probable that additions will be made to both the Sumner and the Webster school buildings this season.

Among the permits recently granted are the following: Zach T. Mullen, two-story, thirteen-room frame dwelling and barn, cost \$8,000. S. M. Klarquist, two-story, sixteen-room brick veneer dwelling, cost \$5,000. H. J. Wilber, two-and-one-half-story, sixteen-room stone dwelling, cost \$20,000. Hill & Lindley, alteration of stone building, cost \$6,000. Minneapolis Sash, Door & Blind Co., three-story frame warehouse, cost \$5,000. B. P. and Carroll Gates, three-story stone veneer tenement, one hundred and eighty rooms, and modern improvements, cost \$90,000. Architect, W. D. Kimball.

Norfolk, Va.—The present prospects, and in fact this year's business, seem dead on account of the heavy bank failures, before which business and the outlook was fine, now nearly every one is idle and many are leaving.

Architect Geo. C. Maser reports: For Wm. F. Wise, two-story and attic frame dwelling, 80 by 86 feet, slate roof, cost \$6,500; projected; plans accepted. For M. McKewitt, two-story brick, 22 by 44 feet, cost \$2,000; under way; E. Heart & J. B. Moore & Co., builders. For C. Hall, three-story brick, with stone and terra-cotta trimmings, tile and slate roof, 25 by 70 feet, cost \$6,000; projected, plans accepted. For E. Moritz, three brick tenements, 57 by 42 feet, cost about \$4,000; under way; A. E. Murray and J. B. Moore & Co., builders. For J. B. Loenber, four brick tenements, 36 by 40 feet, cost \$3,400; projected; taking bids. For Messrs. Phil. Brown & Co., five-story brick addition to "Purcell House," 70 by 20 feet, cost \$4,500; projected; taking bids. For Bank Street Baptist Church (colored), alterations and additions, cost \$12,000; projected; plans accepted. For Union Veteran Association Armory (colored), three-story frame building, 27 by 23 and 27 by 75 feet, cost \$2,300; bids just closed.

Pittsburgh, Pa.—Prospects good.

Architect Geo. S. Orth reports: For Geo. K. Stevenson, office building, 40 by 112 feet, six stories high, brick, with granite trimmings, cost \$84,000; under way; A. & S. Wilson, builders. For Mrs. Mary Hays, residence, 50 by 63 feet, brick, with terra-cotta and molded brick trimmings, cost \$19,000; under way; Wm. M. Brown, builder. For D. W. C. Bidwell, six three-story brick dwellings, 94 by 55 feet, cost \$18,000; under way; C. A. Ralph, builder. For Mrs. H. B. Aiken, brick residence, 40 by 38 feet, cost \$6,000; under way.

Sedalia, Mo.—The Pettis county court house (J. G. Cairns, St. Louis, architect) is up to the second story. The style is Renaissance. It is to be two stories and basement in height, walls to be faced with Warrensburg stone, 99 by 135 feet, cost \$125,000.

Suffolk, Va.—For Wm. H. Jones, two-story brick, 40 by 60 feet, cost \$3,700; under way; Geo. C. Moser, architect, Norfolk, Va.

St. Louis, Mo.—Architect C. K. Ramsey reports: For Martin Collins, row of four small dwellings, brick walls, cutstone trimmings, 75 by 54 feet, cost \$10,000; under way; contracts sub-let. For Geo. W. Simpkins, brick dwelling, 29 by 53 feet, stone, terra-cotta trimming, slate roof, cost \$8,000; under way; contracts sub-let. For Mallinscroft, Chemical Works, one-story brick warehouse, 80 by 160 feet, composition roof, cost \$9,000; under way; contracts sub-let. For H. T. A. Linchey, modern frame dwelling, 38 by 42 feet, shingle roof, cost \$5,000; contract sub-let. For Alfred Bevis, row of small dwelling and one store, with flat above, brick fronts and walls, composition and slate roof, 75 by 52 feet, cost \$10,000; plans under way.

Architect W. G. Gains reports: For J. V. Rivers, brick dwelling, 22 by 68 feet, terra-cotta trimmings, cost \$7,000; projected. For J. W. Todd, store and tenement, 25 by 48 feet, cost \$4,000; taking bids. For S. A. Dunn, store and tenement, iron and brick front, 25 by 52 feet, cost \$4,000; projected. For Ch. Walthers, at Carte Brillante, eight-room brick dwelling, 40 by 40 feet, cost \$5,000; taking bids. For J. H. Rivers, store and tenement, 20 by 42 feet, cost \$3,200; projected. For S. Peterson, at Kirkwood, frame cottage, 22 by 33 feet, cost \$3,500; taking bids. For J. Cochran, twelve-room dwelling, 35 by 50 feet, stock brick, stone and terra-cotta trimmings, cost \$10,000; projected. For Geo. Williams, two-story, six-room frame cottage, 25 by 48 feet, at Cheltenham, cost \$3,200; contract not let. Also small jobs, alterations, additions, etc.

Architect J. G. Chairs reports: For Geo. R. Wilson, two-story flats, 35 by 145 feet, brick and terra-cotta, forty-two rooms, cost \$20,000; building, cellar walls; contract sub-let. For John Adams, five two-story tenements, brick with stone fronts, 200 by 180 feet, cost \$21,000; excavating; contract sub-let. For Mrs. Jos. Lucas, three three-story brick and terra-cotta houses, cost \$13,000; preparing plans. For Joseph Ward, five two-story brick and terra-cotta dwellings, 80 by 53 feet, cost \$15,000; building cellar walls; J. R. O'Brien, builder. For Mrs. Steele, Mr. Joseph Gannon and Andrew Parke, two-story and attic dwellings, brick with Warrensburg stone fronts, cost \$12,000; contract sub-let.

Architects James Stewart & Co. report: For Scott county, Ill., two-story court house, 80 by 68 feet, to be built of St. Louis hydraulic pressed brick, cost \$38,000; contract let April 20 to Messrs. Mathews, Buckingham and Zeigler, of Jacksonville, Ill. For Wm. Steinbreder, three-story store and office building, 51 by 50 feet, cutstone front, cost \$13,000; contract let; James Stewart & Co., builders. For James A. Gregory, two detached houses, one thirteen rooms, one ten rooms, stock brick fronts, cost \$18,000; plans being prepared. For St. Louis Cable & Western Ry. Co., engine building and car station, also office building, St. Louis pressed brick fronts, 175 by 135 feet, cost \$25,000; ready for roof; James Stewart & Co., contractors. For T. P. Schulte, three-story brick residence, 24 by 68 feet, Denver red stone trimmings, cost \$10,000; under way. James C. Stewart, contractor. For Thomas Halpin, two-story office building, 60 by 40 feet, cost \$12,000; under way; Thomas Lowe, contractor.

The annual report of the commissioner of public buildings for the fiscal year beginning April 8, 1884, and ending April 13, 1885, showed that during the year there had been erected 2,145 brick buildings at an estimated cost of \$6,583,968; 609 frame buildings at an estimated cost of \$465,446; additions, alterations, etc., \$519,538; grand total, \$7,568,952.

Vincennes, Ind.—The contract for the erection of Mr. Chas. Graeter's, new block, corner of Third and Main streets (Messrs. Clark and Pyne of Evansville, Architects), has been let to Mr. Charles Pearce. The design is excellent, and this block will indeed add much to the architectural beauty of the city. The building will be three stories in height, containing three stores on first floor, 134 feet in depth. It will be substantially built of brick and stone, and cost about \$21,000.

York, Neb.—Architect W. E. Bell reports: Working on plans for M. E. church building, to be erected here. It will be gothic style of architecture, stone and brick basement, brick veneer superstructure, with stone and galvanized iron trimmings, stained glass windows, cost \$15,000.

PRICES OF LABOR.

	Akron, O.	Austin, Tex.	Bloomington, Ind.	Chicago, Ill.	Cheyenne, W. T.	Cincinnati, O.	Dubuque, Ia.	Des Moines, Ia.	Detroit, Mich.	Evansville, Ind.	Fargo, D. T.	Hastings, Neb.	Joliet, Ill.	Kansas City, Mo.	Minneapolis, Minn.	Omaha, Neb.	Sioux City, Ia.	St. Louis, Mo.	Toledo, O.
Bricklayer.....	\$1.00	\$4.00	\$4.00	3 50@4.00	\$6.00	\$4.50	\$4.00	\$4.00	\$3.50	\$3.75	\$3.50	\$4.00	\$3.00	\$4.00	\$4.00	\$4.00	\$3.50	\$4.50	\$4.50
Brickmason (Front).....	.....	5.00	5.00	4 50@5.00	10.00	4.50	5.00	4.50	4.00	4.50	4.00	4.50	4.00	5.00	6.00	.....	3.75	5.00	6.00
Carpenter.....	2.50	2.50	2.50	2 50@2.75	3.50	2.50	2.75	2.50	1.75	2.00	3.00	2.25	2.50	3.00	2.50	2.50	2.50	3.00	3.00
Cabinetmaker.....	.....	.....	.....	.....	3.00	.....	.....	3.00	2.00	.....	.....	.....	.....	3.50	2.50	2.50	2.50	3.00	3.00
Finisher.....	.....	3.00	.....	3.00	3.50	3.00	.....	2.50	2.00	.....	.....	2.50	.....	3.00	3.00	3.00	.....	2.75	3.00
Gasfitter.....	.....	.....	.....	2 50@3.00	3.25	3.25	.....	2.00	2.25	3.50	3.00	3.50	.....	2.50	3.00	3.50	4.00	3.50	3.50
Laborer.....	1.75	1.50	1.50	1 25@1.75	2.50	1.50	1.50	1.75	1.25	1.00	1.75	1.50	1.75	2.00	2.50	1.50	1.50	1.50	3.00
Painter.....	2 00@2.25	2.50	.....	2 25@2.50	3.00	2.50	2.50	2.25	3.00	2.50	2.50	2.00	2.50	2.50	2.50	2.50	2.00	2.50	3.00
Glazier.....	.....	.....	.....	.....	3.50	.....	.....	2.25	3.00	2.50	2.50	.....	2.00	3.00	3.00	3.00	.....	2.50	2.50
Plasterer.....	2.50	3 50@4.00	3.50	8 hrs. 3.50	4.50	3.50	3.00	3.50	2.50	3.00	3.00	3.00	3.00	3.50	3.50	4.50	2.75	4.50	5.00
Plumber.....	.....	2 50@3.00	.....	3 50@4.00	4.00	3.50	3.00	3.00	2.75	5.00	3.00	3.00	4.00	3.50	2.75	5.00	3.50	3.50	5.00
Stonemason.....	3.00	3.50	.....	4.00	5.00	3.50	3.50	3.50	3.25	5.00	.....	3.00	3.50	3.00	3.50	3.50	3.00	4.00	4.00
Carver.....	5.00	.....	4.00	4 50@5.00	4.50	5.00	.....	5.00	5.00	5.00	.....	.....	.....	4.00	5.00	.....	.....	6.00	6.00
Stonemason.....	3.50	4.00	4.00	3 75@4.00	5.50	3.50	3.50	4.00	3.00	3.00	.....	4.00	3.50	3.00	3.50	4.00	4.00	4.00	4.00
Stonesetter.....	3.50	3.50	3.50	4.00	4.00	4.00	.....	4.50	3.50	3.50	.....	3.00	3.50	3.00	4.00	4.00	.....	4.00	4.50
Roofer (Tin).....	.....	.....	2.75	2.75	3.25	2.75	.....	2.00	3.50	3.00	3.00	3.00	2.50	2.50	3.00	3.00	.....	2.50	2.50
Slater.....	.....	.....	2.75	3.00	3.25	3.25	3.50	3.00	2.25	3.00	.....	.....	.....	3.00	3.00	.....	.....	3.00	3.00
Stairbuilder.....	.....	3.50	3.00	3 25@3.75	4.50	.....	.....	3.25	3.00	5.00	.....	4.00	4.00	3.00	3.00	.....	.....	3.00	5.00
Steamfitter.....	.....	.....	3.50	3.50	3.50	3.50	3.50	3.25	2.75	3.00	3.50	3.50	3.50	3.50	3.50	4.00	.....	3.50	3.50

PRICES OF BUILDING MATERIALS.

CHICAGO, April 10, 1885

	BRICK.	Per M.
<i>Common</i>	\$ 8 25 @	87 50
<i>Fronts:</i>		
Chicago pressed (Anderson).....	22 00 @	21 00
St. Louis pressed.....	27	27 00
Purington Kimbell "Standard"	26	00
Indiana pressed.....	16 00 @	28 00
Philadelphia pressed.....	42 00 @	45 00
Milwaukee pressed.....	25	00
Trenton.....	38	00
Zanesville (Harris Bros.).....	33	00
Perth Amboy Buff.....	50	00
" Mottled.....	50	00
<i>Moulded:</i>		
Chicago (Anderson).....	\$65 00 @	300 00
St. Louis.....	50 00 @	125 00
Indiana.....	25 00 @	50 00
Zanesville (Harris Bros.).....	75	00
<i>Enameled:</i>		
Enameled edge.....	90	00
Enameled edge and end.....	105	00

<i>Marble, continued :</i>			
Vermont, white	3	50@	8 00
Ophite	4	50@	5 00
Armodite			1 50
<i>Slate :</i>			
Roofing, Vermont, per square :			
Green			6 50
Purple			6 50
Red			13 50
Black, Lehigh	5	75@	6 75
Black, Chapman's	7	30@	8 00
Black, Bangor	5	50@	5 80

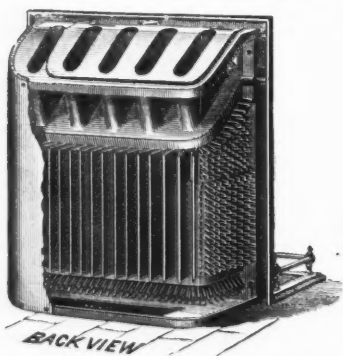
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(Quotations furnished by Charles B. Crombie & Co.)

Redwood lumber.....	\$60 00@	\$65 00
Redwood shingles—square, sexagon, round, diamond and octagon, small quantities....	6 50@	7 25
Mexican Spanish cedar.....	150 00@	300 00
California pine.....	65 00@	75 00

<i>Georgia Yellow Pine:</i>		
Flooring:		
1st & 2d clear, 4 in.....		35 00
1st & 2d clear, 6 in.....		35 00
Boards, D 1 s.....	33 00@	35 00
Beaded Ceiling:		
1st & 2d clear, 1/2 in.....	18 00@	21 00
3/8 in.....	26 00@	30 00
5/8 in.....	33 33@	36 00
Step plank:		
1st & 2d clear 1 1/2, 1 1/2 & 3 in.....	33 00@	35 00
<i>Georgia Cypress:</i>		
Lumber, 1st & 2d clear.....	35 00@	40 00
Shingles.....	3 75@	4 25
<i>Frame Oak Lumber and Timber:</i>		
Plank.....	23 00@	25 00
Timber.....	24 00@	30 00

PAINT, ETC.		Dry.	In Oil.
White lead (American).....	\$	5 3/4	5 3/4
Zinc, white (American).....		8 1/2 @ 10 @	10 @
Red, Venetian.....	2 @	6 @	12
Red, Vermilion.....	2 @	50 @	40 @ 1 00
Red, Indian (English).....	2 @		22
Yellow, Ochre.....	2 @		15
Yellow, Chrome.....	18 @		25
Green, Chrome.....	12 @		20
Green, Paris.....	20 @		35
Black, lamp.....	8 @		30
Blue, ultramarine.....	16 @		35
Putty.....			3
Whiting (dry).....	1 @		2
Paris white (English).....	2 @		3
Litharge (American).....	6 @		10
Sienna, burnt.....	9 @		16
Umber, burnt.....	7 @		16
Oil, linseed (raw), per gal.....			51
Oil, linseed (boiled), " ".....			54
Turpentine.....			37
Varnish, coach, " ".....	1 25 @		40
Varnish, shellac, " ".....	3 25 @		2 00

HARDWARE.		Per Keg.
<i>Nails.</i>		
Spikes, wrought.....		\$3 50
Tenpenny, common.....		2 30
Shingle, 4's.....		2 05
Lath, 3's fine.....		5 30
Steel nails, 10's to 60's.....		2 35
For finishing-nails add	\$1.65 per keg.	
For casing-nails add	75 c. per keg.	



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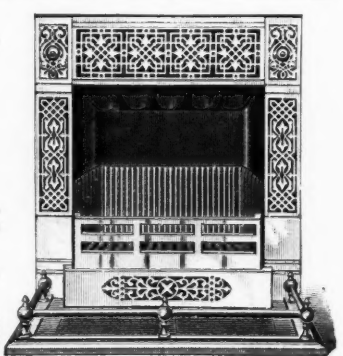
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The smaller room (an office 16 x 16 ft.) has heat and ventilation enough, by means of one of the grates, but we have had a terribly cold winter, very often 39° below zero, and for a long time 25° below, and during such weather the grate in the larger room (an office 26 x 16 ft., which opens by an arch into another office 12 x 16 ft.), was hardly equal to the work, but it is good for any weather not colder than 20° below zero. In zero temperatures nothing could more agreeably heat and ventilate those large rooms than the grate did.—DR. ROMAINE J. CURTIS. *Foliet*. III.

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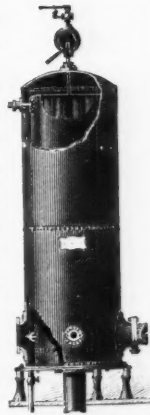
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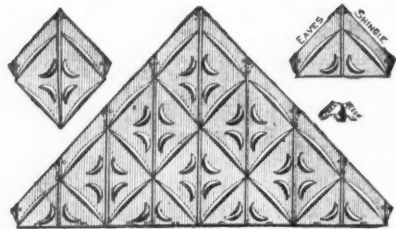
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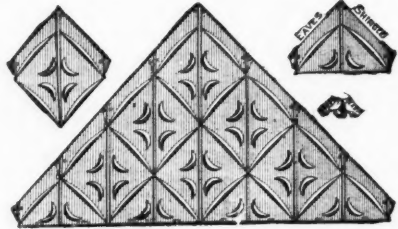
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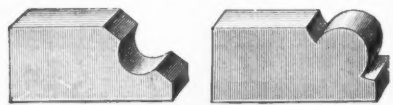
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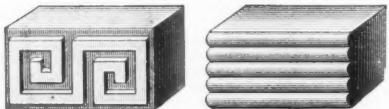
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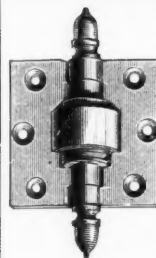
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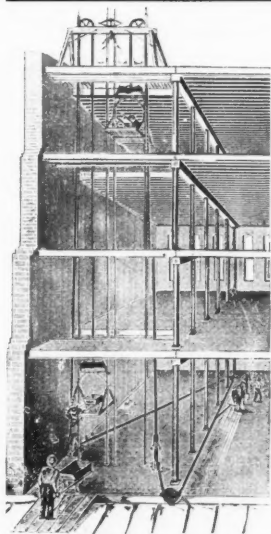
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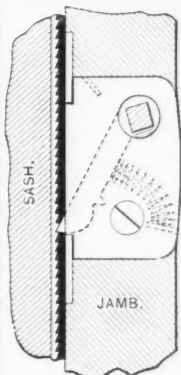
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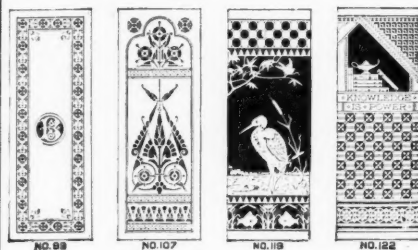
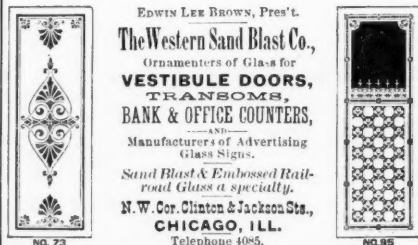
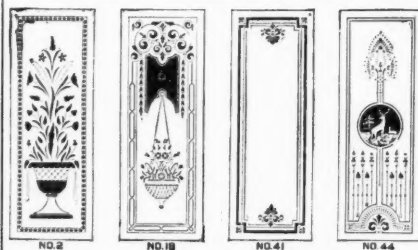
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NOTICE TO ARCHITECTS.

STATE OF COLORADO,
OFFICE OF THE BOARD OF CAPITOL MANAGERS,
DENVER, April 16, 1885.

In pursuance of an act of the Fifth General Assembly of the state of Colorado, entitled, "An act to provide for the erection of a state capitol building at the city of Denver, and creating a board of management and supervision, and appropriating funds therefor," plans and specifications for a capitol building, which, when erected, shall not cost to exceed one million dollars, will be received by the board of managers until 12 o'clock meridian, on the tenth day of July, 1885.

The said capitol building will be erected upon the summit of a plat of ground in the city of Denver, state of Colorado, known as Capitol Hill, with its principal facade to the west. The length of said building to be about 300 feet, and no plans will be considered for a building that are over 310 feet in length. The breadth, height, and general form must be in such proportion to its length as to constitute a symmetrical building, and must be constructed with special regard to strength and durability. The facing and ornamentation of the superstructure, including cornices, pediments and balustrades, will be of stone.

Drawings must consist of foundation, sub-basement, basement, and first, second, and third story plans, roof plans, and section of the same, longitudinal section, transverse section, front, rear, and end elevations, dome plan, giving section of same, and material used, and method of construction from base to summit. Also giving diameter or area of base, style of architecture, and extreme elevation.

The said capitol building shall be built of stone, brick and iron, as far as practicable, and of material found in the state of Colorado, provided the same can be found in said state as cheaply as other materials of like quality in other localities. The entire building must be made, as nearly as possible, fireproof. The laws of acoustics must be carefully observed. The materials used in said building must be of the best quality. Provision must be made for steam heating apparatus, and for the drainage, lighting, and ventilating of said building in the most approved manner; and such a number of fireproof vaults as may be necessary for the preservation of the books and papers of the various departments of the state government; also for elevators, water closets, etc.

All plans and scale drawings must be put on wooden frames or stretchers, in order that they may be convenient for examination, and on a scale of one-eighth inch to one foot.

Compensation for plans and specifications will be as follows: For the best set of plans and specifications the sum of \$1,500; for the second, \$1,000; for the third the sum of \$800. All plans and specifications for which money is paid shall become the property of the state. The architect whose plans are adopted will be required to furnish the same in duplicate. For the detailed working plans and supervision the amount shall not exceed 2½ per cent of the cost of said building. No plan will be adopted until it shall be definitely ascertained that the entire cost of said capitol building shall not exceed the sum of \$1,000,000.

Said building must contain the following rooms, and such other rooms as convenience and symmetry require:

The sub-basement shall be eight feet between joists, and adapted to the use of the machinery, etc., of the building.

The basement story to be not less than fourteen feet between joists, and extend twelve feet above the surface of the surrounding ground. Said basement story to be divided into rooms to be used for the Adjutant General's quarters, Historical society, Horticultural society, State Geologist, and Mineral cabinet, Commissioner and Inspector of Mines, and storage rooms.

First, or principal office story, to be not less than twenty feet between joists, and to contain, as near as practicable, the following rooms, to-wit:

Three rooms for the governor.
Same for secretary of state.
Three rooms for auditor of state.
Same for state treasurer.

Two rooms for insurance department, two rooms for attorney general, three rooms for state engineer, three rooms for railroad commissioner.

Four rooms for state board of land commissioners, three rooms for superintendent of public instruction.

Second, or double story, to be not less than forty-two feet between joists. The senate chamber, hall of house of representatives, supreme court room and state library to be of full height, other rooms to be approximately half of said height.

One senate chamber, with lobbies and galleries of appropriate dimensions, to accommodate fifty senators, one room for lieutenant-governor and president, one room for secretary of senate, one postoffice, one stationery and bill room, one sergeant-at-arms room, cloak room, lavatory and closets, two rooms for engrossing committee, two rooms for enrolling committee, and not less than ten other appropriate committee rooms for the use of the senate.

One hall for house of representatives, with lobbies and galleries of appropriate dimensions, to accommodate 100 members; one room for speaker of the house, one room for chief clerk of house, one postoffice, one stationery and bill room, sergeant-at-arms room, cloak room, lavatory and closets, two rooms for engrossing committee, two rooms for enrolling committee, and not less than ten other appropriate committee rooms for use of house of representatives.

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The drawings must be sent to the "Board of Capitol Managers," Denver, Colorado, and be indorsed "Plans for State Capitol Building," and must come under a *nom de plume*, the real name and address to be sent to the Board of Managers in a sealed envelope, marked "private," which will not be opened until after the award is made.

The Board reserves the right to reject any and all plans.

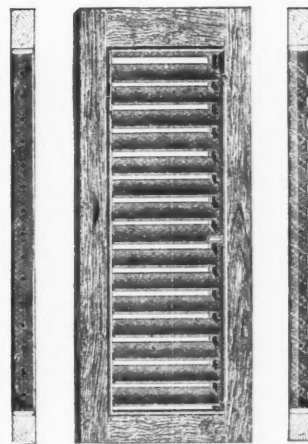
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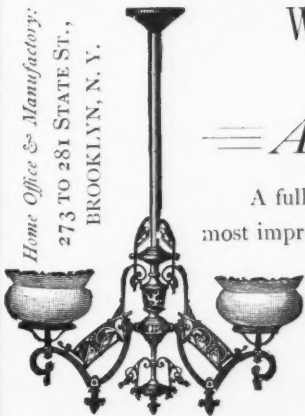
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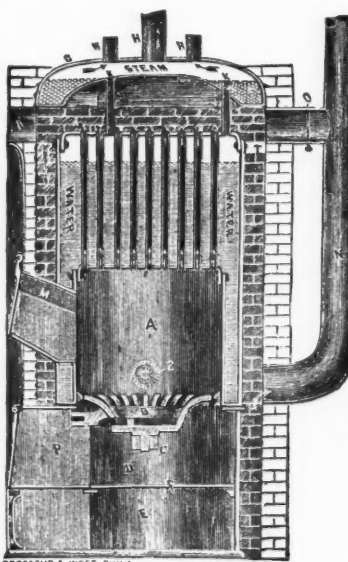
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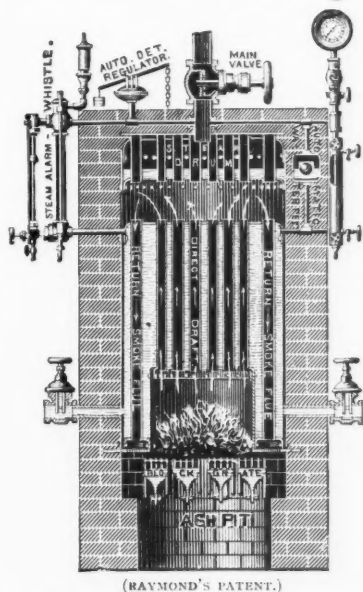
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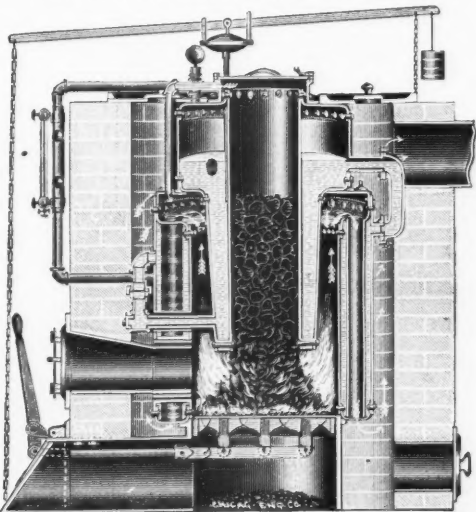
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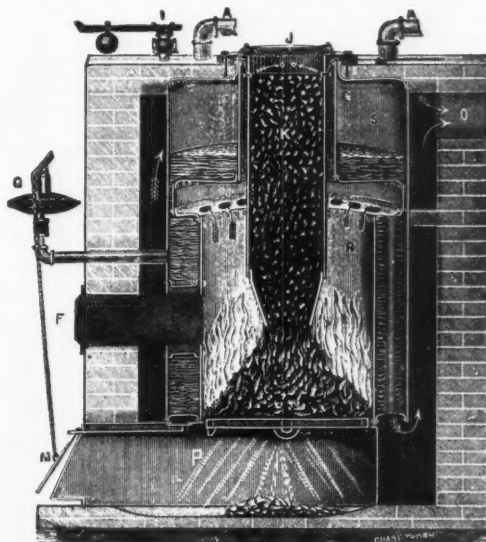
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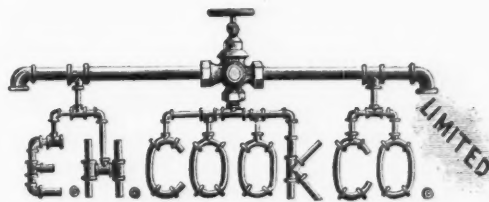
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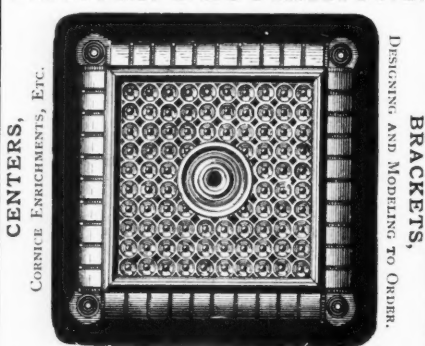
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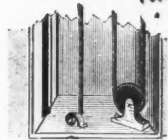
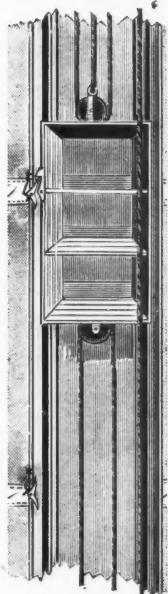
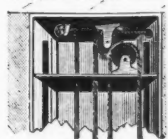
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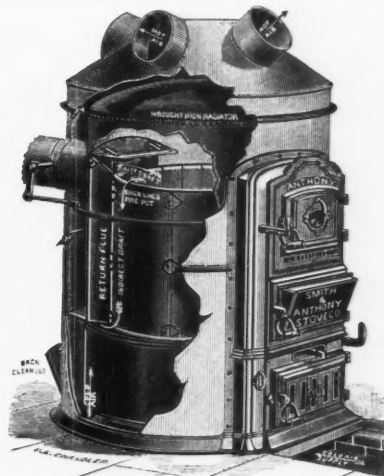
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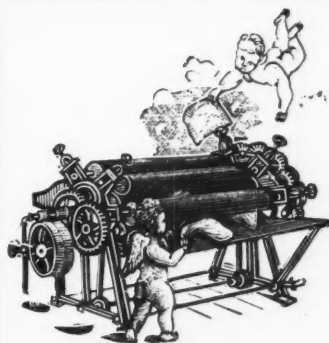
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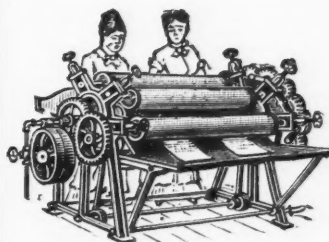
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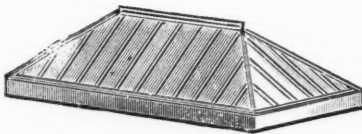
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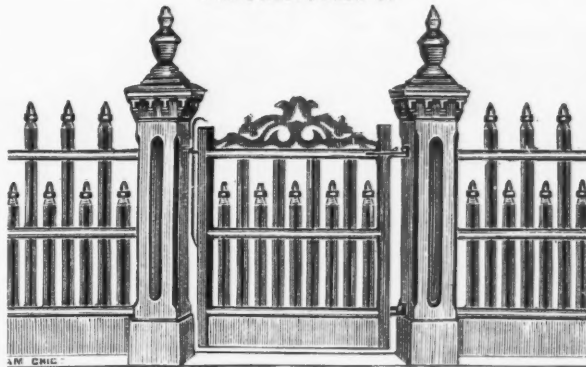
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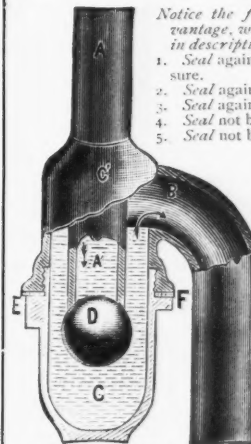
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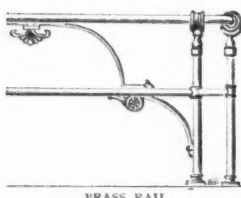
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