DESIGN OF A CITY RESIDENCE.

The idea of the design was to get a residence of palatial proportions which would be well adapted to both formal and informal gatherings. A pleasant approach was gained by combining the porte cochere. The vestibule is large and opens by an immense arch with the hall and from the hall direct access is obtained to all the various rooms. The landing of the main stair was arranged for an orchestra platform.

The first floor is to have a large central hall running North and South from which are to open the principal rooms. The stair case and large landing are its main features. From the latter can be had a full view of the conservatory in one direction, of the vestibule arch and hall fireplaces in the other.

The second and third floors have much the same general arrangement as the first. On the second floor are located the guest's chambers, provided with private bath, dressing rooms and closets. The chambers on the North and East are arranged to form a suite. From the rear hall opens the elevator, and from the bath room chute.

The third floor contains the household sleeping rooms on the South and East, the servant's bed-rooms on the North.

The conservatory is large, lies south-west, is easily accessible from the main hall and garden.

The building is to be of a cream Roman brick, trimmed with a buff rubbed finish sandstone.

The design of the facades do not indicate any particular style of architecture or that of any individual epoch but simply
been massed to meet modern requirements with a free use of Renaissance details and forms which bring it nearest to the style of this period.
DESCRIPTION OF THESIS.

The plans for the summer hotel here submitted are intended for a resort of some pretensions.

The large and extensive porches and broad projecting cornices are designed to give the whole a low and broad effect. The building is assumed to face the east, fronting on a lake, and to be surrounded by extensive grounds.

The style of architecture is Renaissance, and the exterior is intended to be constructed of cream-colored Roman brick, with terra-cotta trimmings a shade darker than the brick.

In a summer hotel the rooms should be large and well-lighted, the halls broad, with good opportunities for ventilation, and there should be a number of bath-rooms for general use, conveniently located. All of these points have been carefully considered and provided for in the plans.

The office is convenient and commands the stairway and the entrance to the dining-room. The dining-room is 26 ft. by 50 ft. and will accommodate about seventy-five persons. The parlor is of the same dimensions as the dining-room, which makes it amply large for dancing.

The privacy, which it is desirable to have for the billiard and card rooms, is obtained by placing them in a wing of the building, quite removed from the more public part.

The rotunda and square hall above are large and well-lighted from the windows on the stair landing.

There are twenty-five bed-rooms, all of which are provi-
-ded with large closets, and the principal rooms are arranged to be thrown together in suites when it is so desired. The toilet rooms and linen closets are conveniently located on the second floor.

The towers are designed to emphasize the central portion of the building, and to give it a lighter effect. They also serve as observatories, and the roof between them has a large deck, which is intended to be covered by an arbor, and to serve as a roof garden.
A Design for a City Hall.

H. G. Hotten. 1896

This edifice is intended to meet the requirements of a city with a population of from 60,000 to 75,000 inhabitants. Its location is to be upon a public square with large and spacious grounds.

This being the most important of all public buildings in the city, I chose a style appropriate for the design of a sober and dignified edifice which clearly expresses at first sight its purport and importance. To gain this end, severely classic motives were chosen for the masses, and other embellishments confined to simple Greek details. The distribution of masses as well as the principal approach have been largely influenced by the House of Parliament at Vienna, by Hansen.

The two side elevations are identical, the other two differing only in that the principal facade has a winding, inclined driveway leading to the main porch; so that on leaving a carriage, one has only a few steps to mount in order to reach the main floor. The other elevation has a massive stairway leading from grade to the main floor.

Entrances into the basement, or ground floor, are provided for under the main porch. The rear porch has a driveway leading under same to serve as Porte Cochere to the police court. Other entrances are provided at each end; one entering directly into the Police court, the oth-
Description of Thesis.

G. C. Liese. 1896

A design for a costly residence, to be located in the suburbs, with spacious approaches upon two sides. The type of the building is that of the Italian Villa, with open loggias as an entrance, in the first and second story. These constitute the central and richest part of the main facade which is otherwise frank and simple in its treatment, save the enriched attic windows of the wings which seem to call for some embellishment. The central portion of the principal facade has a loggia upon each floor making a very imposing entrance on the first floor and a quiet retreat on the second.

The right and left wings extend in front of the central portion and this with the large projecting cornice, gives a very pleasing effect to the double loggia.

Each of the other two facades are treated in a simple manner but in keeping with the remainder of the building.

The vestibule is spacious and supplied with a closet at each end. On the first floor the two parlors, living, reception and dining rooms open into a spacious hall: The reception room is so located that guests can be brought here without passing the parlor doors and then can be taken direct to parlor, music room, etc. If necessary the two parlors, music and reception rooms can be thrown into one, and again they can almost be closed into separate rooms.
The east wing contains dining room, living room and kitchen. Direct communication is had between dining room and sitting room, while the den or smoking room is in the west wing and does not interfere with any of the other rooms. The ground staircase which is located opposite the entrance, presents an imposing appearance. Two flights of stairs lead to a landing, and from here a magnificent view of the hall and adjoining rooms can be had. On the landing are three large windows which light the hall and decorations in a most effective manner.

On the second floor all the bed rooms can be reached, from the hall. The general bath room can be easily reached from all rooms. The principal bed room is equipped with dressing room, bath and closet. All other rooms have large closets, and the guests' chamber is also supplied with a dressing room.

In closing one door on the second floor the servants are cut off from the rest of the house, but have access to their apartments.
This building is a design for a Club House to be located somewhat retired from the business part of the city. It is to be placed upon spacious elevated grounds, leaving a broad terrace in front, and grounds sloping to the rear in order to give a high well lighted basement. The building is to be used by a club consisting of about sixty members, for social purposes. The interior has been so designed that every convenience requisite to meet the demands of a modern clubman, have been met. The arrangements of plans are also very convenient for entertainments and social gatherings, which was one of the principal objects to be attained. Cloak rooms for both ladies and gentlemen are so arranged that one may pass through the cloak room, and after removing the wraps, appear in the grand hall in evening dress.

On the first floor is a large spacious lounging room or parlor, reception rooms for ladies and gentlemen, reading room, billiard hall, cafe with a large serving room, office and toilet room, all opening upon a grand hall, which is connected with the second floor by a wide well lighted stairway.

On the second floor are the dining rooms, comprising an extensive banquet hall, general dining halls, and private dining
rooms; all of which open into a grand hall. This hall contains a large well hole in the center through which an excellent view of the hall below may be had. Adjoining this hall is a loggia which gives it ample light and can be made quite airy in summer by removing a screen of glass from the front. This loggia may also be made available for band concerts to an audience on the terrace. The dance hall occupies the entire central portion of the third floor, and is accessible by a double stairway from below. Along either side is an arcade forming cozy nooks and connected with the hall; on either side is a large retiring room. The rest of the third floor is used for chambers and servants' apartments.

The basement contains the kitchen and pantries, bowling alley, gymnasium, baths, etc.

The exterior of the building is excellently adapted to a building of this nature, although it has not been much used. Its facades are grouped similarly to the late Chateaux of France, while the fenestration and details are almost entirely confined to those found in the best examples of the architecture known as that of Francis the I, such as the Hotel de Ville at Beaugency, Chateau of Blois, Chambord, Orleans, etc.

A pleasing main facade is effected by a rich central portion flanked on either side by a wing similar in treatment. The pleasing effect of the principal facade is produced by the arcade below,
the treatment of the windows above, and the rich projecting cornice surmounted by a beautiful balustrade, which give the whole a light and airy appearance, all of which helps to suggest a club house.

The walls are to be of a light colored sandstone, which is especially adapted to the delicate treatment of the building. The roof will be quite high, broken up with rich French domers which are characteristic of the style.
Design for a
Heating and Ventilating Plant
for a School House.

" Thesis "
for the Degree of Bachelor of Science
in the School of Architecture,
by
ROBERT P. MANARD.

University of Illinois.

-1896-
DESCRIPTION OF STEAM HEATING

and

VENTILATION PLANT FOR A SCHOOL HOUSE.

In designing a successful heating and ventilating plant for a school house one should endeavor to obtain an abundance of fresh air for ventilation, and at the same time keep the rooms at the constant temperature of 70° Fahr. To do this, experience has taught that, with the frequent variations of climate and temperature in this country, the ventilation should be supplied by mechanical means in order to have a satisfactory and reliable plant.

In this building, it is proposed to furnish 1800 cu.ft. of fresh air per hour per pupil in rooms where the number of pupils is known and to assume the air to be changed 10 times per hour in other rooms.

The computations are given for both indirect Steam heating with natural ventilation, and for the hot blast system with forced ventilation.

Fresh air is supplied to all rooms which are heated by direct radiators placed in the main halls and supplied with risers and returns.

The exhaust steam from the engine is utilized for heating in the coil section nearest the fan.

The system selected for this building is the B.F. Sturtevant and Co., single pipe, hot blast, Low pressure, steam.
heating apparatus. With this system the ventilation is obtained by forcing large quantities of fresh air through heaters composed of coils of 1" pipe and thence into a hot air chamber. From here the warm air passes through galvanized iron ducts to the various vertical flues and into the rooms. The heater is so arranged that when the temperature in any room gets too warm a portion of the air instead of passing through the heater, passes under a raised platform into the duct, the quantity being regulated by a mixing damper at the inlet of the duct. These dampers may be regulated automatically by thermostats in each room, or mechanically by a chain and pulley arrangement.

The hot air enters each room through registers in the flues, placed 10 feet from the finished floor. The foul air passes out at registers placed in the base boards next to the floor. Where convenient the hot air flue of one room is utilized for the ventilation of the next room above, a brick arch separating the two openings.
DESCRIPTION OF SCHEDULE.

In the following schedule the computations were based upon the facts given below.

Exterior wall of solid brick, 16" thick.
Basement Ex. walls of stone, 24" " .
Clear Ht. of basement 10'
" " " Ist, 2nd, and 3rd stories 13' each.
All windows 3 1/2' wide and 8' high except those windows at back of pupils in rooms marked School Rooms and in basement.
These are 3 1/2' X 4'.
Max. tem. of outside air $\theta = -20^\circ$
Min. tem. " " " $\theta = 50^\circ$
Tem of air in room $t = 70^\circ$
<table>
<thead>
<tr>
<th>Column 1</th>
<th>Room Number found on plans circumscribed by a circle.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 2</td>
<td>Capacity of Room in cu.ft.</td>
</tr>
<tr>
<td>Column 3</td>
<td>Exposed wall surface in sq.ft.</td>
</tr>
<tr>
<td>Column 4</td>
<td>Exposed window area or glass area in sq.ft.</td>
</tr>
<tr>
<td>Column 5</td>
<td>Number of sq.ft. of direct radiation required according to Mill's Rule, which is the sum of the No. of cu. ft. of contents / 200. sq. ft. Exposed Wall area / 20. sq. ft. Glass / 2.</td>
</tr>
<tr>
<td>Column 6</td>
<td>Number of sq.ft. of Indirect Radiation according to Mills = Number sq.ft. Direct Rad. X 1.5.</td>
</tr>
<tr>
<td>Column 7</td>
<td>Maximum Number of persons occupying room.</td>
</tr>
<tr>
<td>Column 8</td>
<td>Max. ventilation in cu.ft. per hour. = Z. Z = 1800 X column 7. or Column I X Column 9.</td>
</tr>
<tr>
<td>Column 9</td>
<td>Number of times air is changed per hour. = N. N = Col.8 / Col.I.</td>
</tr>
<tr>
<td>Column 10</td>
<td>Number of Heat Units required for Ventilation per hour</td>
</tr>
</tbody>
</table>
\[ M = Z \theta (t - \theta) \cdot \theta = 70^\circ = -20^\circ \cdot Z = \text{Col.8} \]

**Column II and I2.**

Total Number of H.U. lost per hr. by transmission through exposed walls and windows \( M \).

\[ M = Q(t - \theta) \quad \text{One wall exposed.} \]
\[ M = \frac{QK'}{Q + K'} + \frac{QK'}{Q + K'} \quad \text{All walls exposed.} \]

Let \( B \) No. of H.U. lost per sq.ft. per Hour, one Exp. wall and \( D \) No. of H.U. lost per sq.ft. per four. All walls exposed.

\[ M = B = 16.32 \text{ H.U.} \quad M = D = 14.05 \text{ H.U.} \]

Then for two walls exposed,

\[ M = \frac{4B + D}{5} = 17.47 \text{ H.U. per sq.ft. per hr. and for three walls exposed,} \]
\[ M = \frac{3B + P + 2D}{5} = 16.61 \text{ H.U. per sq.ft. per hr.} \]

For windows with single glass.

\[ M = \frac{Q(t - \theta)}{2} \quad \text{For glass } K = 0.596 \]
\[ \begin{cases} 4434, & \text{whole windows.} \\ 447, & 1/2 windows. \end{cases} \]

\[ M \text{ for whole windows } = 46.773 \text{ H.U. lost per sq.ft. per Hr.} \]
\[ M \text{ half } = 48.286 \text{ H.U.} \]

**Column I3.**

Maximum ventilation in cu.ft. per second,

\[ \frac{Z}{3600} = \frac{Z}{3600} \]

**Column I4.**

Maximum temperature of hot air entering room,

\[ T = \Theta + \frac{50}{Z}(M + M'). \]
Column 15.

Minimum temp. of hot air entering room

\[ t' = (T - 70^\circ) \times 2/9 + (70^\circ) \] obtained from the proportion.

\[ 90^\circ : 20^\circ :: X : A \quad \therefore A = 2/9. \]

Thus \( (79.75 - 70^\circ) \times 2/9 + 70^\circ = 72.19^\circ \) = Min. temperature.

Column 16.

\[ V = \text{Maximum velocity in hot air flues in ft. per sec. with natural ventilation. Obtained from the formula: } \]

\[ V = 4 \sqrt{\frac{H (T - 0)}{459.0}} \]


\[ \Theta = "\text{External air.} \]

\[ V = 4 \sqrt{\frac{12 (79.75 - 20)}{439}} \]

H = ht. in ft. of flue from inlet to outlet.

<table>
<thead>
<tr>
<th>Ist. floor</th>
<th>2nd. floor</th>
<th>3rd floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>459</td>
<td>26'</td>
<td>40'</td>
</tr>
</tbody>
</table>

66 ft. per sec.

Column 17.

\[ V = \text{Minimum Velocity in Hot air flues.} \]

Obtained from same formula as Column 16, using Minimum value of \( T \) and \( \Theta \)

\[ T = t' = \text{Column 16} \quad \Theta = 50^\circ \text{ F} \]

Column 18.

Maximum Area of hot air flues in sq.ft.

Required for natural ventilation.

\[ A = \text{Column 15} \div \text{Column 17}. \]

Column 19.

Maximum Velocity in foul air flue in ft. per sec.

\[ V_f = 4 \sqrt{\frac{H(T - 0)}{459.0}} = 4 \sqrt{\frac{68 \times 99.75}{439}} = 15.72 \text{ ft. per sec.} \]
H = 80 ft. for basement  
T and θ have same values as in Hot Air flues.

68 ft. " 1st floor.
54 ft. " 2nd ".
40 ft. " 3rd. ".

Column 20.

Minimum Velocity in foul air flues in ft. per sec.
\[ v' = 4\sqrt{\frac{H(t-θ)}{459}} \] 
Using min. values of t' and θ.

Column 21.

Maximum Area of foul air flues in sq. ft.

\[ A' = \text{Column 13} \div \text{Column 20}. \]

Column 22.

Maximum area of Vertical hot Air flues required for the fan system.

Found by assuming a velocity of 800 ft. per min.

\[ A = \frac{\text{Max. Ventilation in cu. ft. per min.}}{800} \text{ area in sq. ft.} \]

Column 23.

Maximum Area of horizontal H.A. ducts in sq. ft. required for Fan system.

Assuming a velocity of 1200 ft. per min.

\[ A' = \frac{\text{Max. Ventilation in cu. ft. per min.}}{1200} \text{ area in sq. ft.} \]

Column 24.

Sectional dimensions of vertical flues.

Column 25.

Sectional dimensions of Horizontal duct.
Column 26.

Total Number of Heat Units required per hour

\[ \text{Total} = M + M' = \text{Col. IO} + \text{Col. II} + \text{Col. I2}. \]

Column 27

Total No. sq. ft. of Direct Radiation required = R.

\[ R = \frac{M + M'}{300} \]

The total number of cu. ft. of air to be handled per min.

= 37,544 cu. ft.

\[ t = 70^\circ \quad \Theta = -10^\circ \]

\[ \frac{37544 \times 80^\circ}{300} = 10,1212. ft. \]

No. of lineal ft. heat 1" pipe required to heat the air with a hot blast apparatus.

\[ \frac{1001.2}{7} = 143 = \text{Horse power} \]

Power of Boilers required to furnish steam economically. + the 15 H.P. to run the engine and for direct radiators = 160 = total Horse power required.

This is to be furnished by two 80 H.P. boilers which will require a smoke flue for each of an area of 3.5 sq. ft.

BLOWER.

The Fan Blower is to be a Sturtevant 8' X 4' blast wheel encased in Sheet steel housing.

ENGINE.

Engine to be Sturtevant low pressure engine having a cylinder 15" in diameter and a stroke of 8". It is to be of a horizontal type and of sufficient capacity to operate the fan
at a speed of 150 revolutions per min. with 20 lbs. at the throttle.
DESCRIPTION OF THESIS.

This building was designed after the style of the Renaissance. In referring to the exterior facades we have the first story the most prominent which effect is brought out by the bolder treatment of the masonry and windows.

The water-table forms the sill-course for the second story, which is quite plain, and has simple rectangular openings.

The main cornice serves to divide the attic story from the second. This cornice, as well as all the other moldings and orders are taken from the Ionic, after Vignola, although modified to suit the proportions of the general mass of the structure.

The attic story is surmounted by a slight cornice and balustrade, which leaves the roof visible only at some distance from the building.

The principal facade is emphasized by a portico, in a modified Ionic order, while the Porte Cochere is treated in the same order.

The main idea in designing the interior was to get large rooms which could be easily thrown together, and to have each outside and inside opening lead the eye to some prominent feature of decoration.

Views of the conservatory may be had from nearly every room on the first floor.

The second floor is divided into suites for the family and guests, each suite having its own living rooms dressing rooms closets and bath.
The third floor is devoted to chambers and servants' quarters. Two flights of stairs enable the servants' quarters to be isolated from the rest of the house.
The term "Sicilian Romanesque" is a misnomer. Romanesque architecture, as we know it in other countries, never existed in the island of Sicily. The architecture of that period is a curious and beautiful product of influences which were not combined anywhere else. The history of Sicily is a story of wars and petty strife from the beginning. We first hear of its being conquered by the Roman general Belisarius. It remained a Byzantine province until it was overrun by the Arabs in the ninth century. They made Palermo their capitol and remained in power until 1090, when they were overthrown by the Normans. The Norman rule was one of tolerance and progress, and Italians, Greeks and Arabs all lived together in peace.

It is their architecture which we know as Siculo-Norman or Sicilian Romanesque, and it possesses the characteristics of all of them mixed and blended together in a way that is peculiar to itself. Fergusson says it is "Greek in essence, Roman in form, and Saracenic in decoration." It is
impossible, however, to fully characterize it in one sentence for in the best examples we know Saracenic forms are as common as Roman and the results of the different influences are very subtly combined. Perhaps the easiest way to think of it is to consider it as a refined Moorish architecture with a strong Byzantine feeling.

In working out a design in this style I have endeavored to catch at least something of its spirit. I have not been able to choose one or even several monuments to use as models, for they all present difficulties which can not be adapted to a modern problem.

The general plan of this design is a basilica of the general type of that time; three aisled, with apses, clerestory supported on columns in the nave, and an open-timbered roof. The plan and general system of the Cathedral at Monreale and that of the Palatine Chapel at Palermo have been followed more than any others. The high Saracenic pointed arches of the nave and central apse have very nearly the proportions of corresponding arches at Monreale. The easy adaptibility of these old plans to the requirements of modern Catholic worship is well known. Pews have to be provided and are indicated on the plan. The seatings were figured on the basis of seven square feet per individual (net). The choir gallery as shown in the section is at the rear of the church and extends across between the two rows of columns. It is approached by stairways in the towers. Part
of the space around and behind the organ may be utilized for cloak rooms for the choir, store rooms for music, etc. The two minor apses are used for the vestry and office, respectively. The other details are those of every well appointed Catholic church.

The most difficult part of the problem has been the treatment of the exterior. All the existing monuments of that period have been either defaced by time or "restored" so that they present exteriorly very few suggestions of any value. I have taken the typical Italian Romanesque basilica and given it a treatment which I think is in harmony with the spirit of the style.

In common with the Italian style of this period the Sicilian style possesses a good deal of the polychromatic spirit. In this design, in endeavoring to follow out this idea, two colors of stone have been used, which with the red tile of the towers and the more somber slate of the roof would present a scheme of color perhaps as varied as our rather quiet northern ideas could enjoy.

The towers are a sort of compromise to the Gothic idea which everyone has that makes him feel that a church should always have something that points toward the sky. But they are subordinated to the main structure to a degree that is never attempted in true Gothic architecture. The detail of the tower was suggested by the towers of the Cathedral at Palermo. This is a much later building and really belongs to
the Gothic period, but it has so much of the Byzantine and Saracenic feeling that it seems that it ought not to be entirely excluded from the earlier style.

In the main entrance I have again made prominent the large Saracenic arches. The open porch bears a suggestion of the warm climate of Sicily, as indeed has been my intention in the whole design. I have introduced in several places the interlacing arches of the apse of Monreale.

The decorative treatment of the interior is only hinted at in the drawings of the longitudinal and transverse sections. To be in strict harmony with the style it should be in mosaic. In itself it is a problem of great interest and would be worthy of the attention of a man like Sullivan. It is not likely that mosaics of marble and precious stones will ever be used on so large a scale in this country, but the same color scheme could be carried out in oil or dis-temper.

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Southern Italy Baedeker.
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Cathedral of San Miniato  Florence.
Cathedral of S. Andrea  Pistoja.
Church of S. Maria Delle Grazie  Milan.
Cathedral of San Martino  Lucca.
Baptistery of S. Stefano  Bologna.
Cathedral  Monreale.
Cathedral  Pisa.
Palatine Chapel  Palermo.
Church of S. Apollinare in Classe  Ravenna.
Church of San Zeno  Verona.
Church  Zara.

MODERN.

Apostel Kirche  Cologne.
Basilica  Munich.

and others.