

Chicago Flat Type Planning: Sustainability and the 1902 Tenement House Ordinance

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ABSTRACT

This paper examines the planning flexibility and the passive ventilation and day-lighting potential of the various multi-unit apartment types developed in response to the 1902 Tenement House Ordinance in Chicago. Instead of thinking about the future of sustainable multi-family housing design as built upon current planning strategies, this paper examines a historic planning precedent that may be more applicable, or appropriate, based upon the criteria of the new sustainability paradigm. Beyond explaining the history and requirements of the Ordinance, this paper illustrates how basic planning strategies adapted from the Chicago two-flat apartment building could be combined and repeated to form ever larger, taller and complex apartment buildings. Today, many “sustainable” multi-unit apartment buildings are planned in a manner that requires constant mechanical ventilation and artificial lighting even during daylight hours. This is done without asking whether a building that requires energy to be habitable should even be considered sustainable. Air-conditioning for housing was not technically or economically feasible until after 1930 so these Chicago flat type apartment buildings relied upon passive planning strategies to ventilate and light each unit. In an era of increasingly expensive energy, the advantages of planning every unit to accommodate the passive ventilation and lighting strategies inherent in these pre-air conditioned designs becomes apparent. Historical resources and field documentation were utilized to explain and illustrate the Chicago flat type planning strategy. The paper concludes that the sustainability paradigm shift is an opportunity to rethink the planning models upon which we base our multi-unit apartment building designs.

INTRODUCTION

I like Chicago courtyard apartment buildings. I like that these buildings are based on a simple planning strategy that can be manipulated to respond to a variety of building sites of different size and configuration (Figure 1). I first became aware of this multi-family apartment building type in the fall of 1984 while on an academic internship at SOM in Chicago. In 1990, as a graduate student, I prepared a research project on Chicago courtyard apartment buildings and I came across a period article published in *Architectural Record* in 1907 that described the Chicago courtyard type. “It will be noticed that ... these lower buildings are arranged around courts so liberal in size that even the rooms on the bottom of the court obtain an abundance of light and air. It is of course, these courts which give the buildings their character ...” [Croly 1907] The

author clearly understood that the apartment buildings he had seen in Chicago were unique compared with those he was familiar with in New York City.

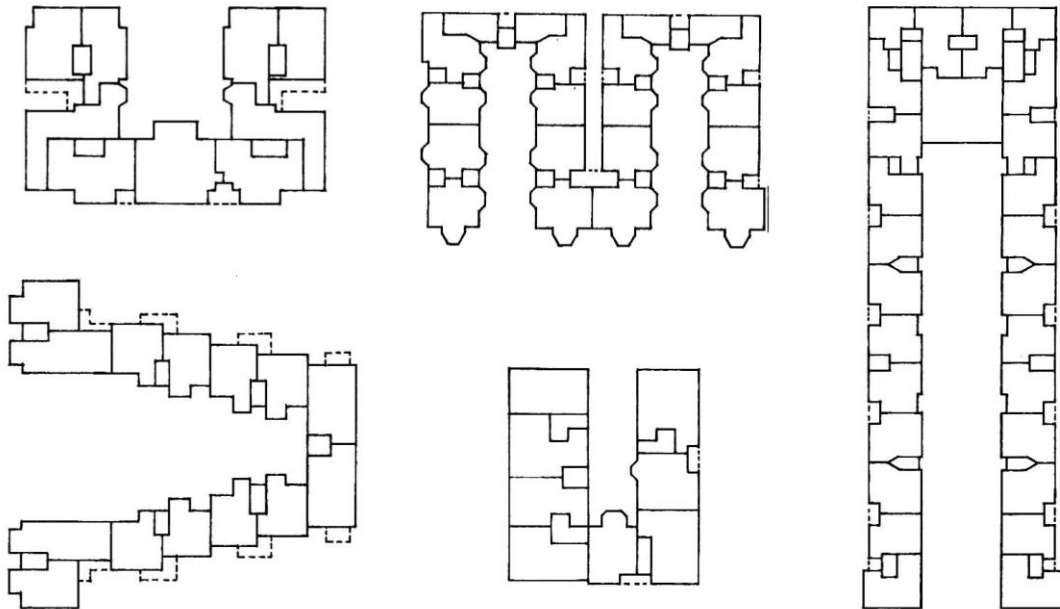


Figure 1. Various Chicago courtyard building plans drawn from Sanborn maps

With this article, I had the first confirmation that the buildings I had seen in Chicago years before were unique. After years of studying courtyard buildings, I started to analyze these buildings in order to see if there were some sort of underlying planning principles that could be diagrammed and explained. Eventually, I came across references to the 1902 Chicago Tenement House Ordinance. After reading the Ordinance, I realized that courtyards, and the other multi-unit apartment buildings developed and utilized during this period in Chicago, were all based upon the planning principles outlined in that document.

PROGRESSIVE ERA SUSTAINABILITY

How would you plan an apartment building if air-conditioning and electric lights were extremely expensive, not an option, or if access to electricity could not be consistently relied upon? As we plan housing that is to be considered sustainable, I think these are some of the most significant questions a designer might ask. I should add that I don't think it is necessary to build buildings without air-conditioning but if we want to give the end user the choice to utilize passive ventilation when the weather permits then we need to plan buildings in a way that maximizes passive ventilation potential. If we agree that this is a valid goal, then the next question we should ask ourselves is what are the multi-unit apartment building precedents we should draw from?

Should we look to apartments that were planned in a period of inexpensive energy utilizing planning and design strategies that could ignore the environment and weather since (with enough energy and technology) any conditions, no matter how

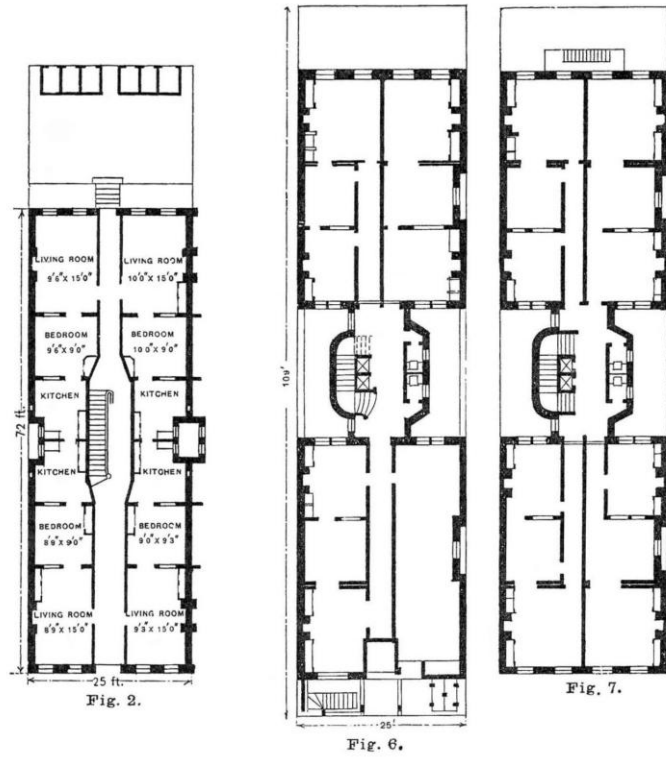
extreme, could be overcome? Should we look to historic precedents developed by ancient civilizations that lacked many of the modern amenities that we expect today? Or rather, should we look back, just far enough, to a time when most buildings included all of the amenities that we are accustomed to and expect today but were planned without air-conditioning because the technology did not yet exist for residential applications? This was a period when codes did not just delineate minimum requirements but prescribed planning and design principles that could be relied upon, when competently implemented, to generate decent passively day-lit and ventilated spaces. I believe the 1902 Chicago Tenement House Ordinance, which was derived from the 1901 New York State Tenement House Act, is one such document. Even though the Ordinance was developed more than one hundred years ago, it might be the most advanced guideline for planning sustainable multi-unit apartment buildings today.

TENEMENT PLANNING PRINCIPALS – NEW YORK CITY VS. CHICAGO

There are many historical, political, social, cultural, contextual and economic reasons why tenements developed differently in New York City than in Chicago and this paper could not even begin to address all of them. However, there are a few obvious planning strategies that are the basis of the differences between the New York City and Chicago tenement types. First, there is a preference in Chicago to organize multi-unit apartment buildings around pairs of vertical stair halls. This circulation scheme distinguishes Chicago tenements from the preference for central corridor type tenements in New York City (Figure 2). Richard Plunz in his book *A History of Housing in New York City* does an excellent job of describing how the pre-law, old-law, and new-law tenements types had evolved from the row house type that had been common in lower Manhattan since colonial times. [Plunz] Second, physical context was a factor since Chicago did not have the same physical limitations that existed on the island of Manhattan and the population of Manhattan was more than double that of Chicago in 1901.

Third, Chicago has alleys. Because Chicago's street grid was laid out to include alleys, all types, and scales, of housing in Chicago could have front and rear entries. Manhattan had a block configuration that turned out to be too shallow for alleys so that is why trash must be collected from the street. Alleys allow even the most modest residential unit planned with the flat type strategy to have a formal and informal entry sequence. This was important historically because, for example, these buildings were built before refrigeration was common and so block ice could be delivered, at any time, from the rear stair landing even while the home owner, or apartment dweller, was away. The rear entry also allowed the owner, or tenant, to take the trash from the units, and ash from the coal fired boiler, out to the alley without having to go through the front entry.

And finally, Chicago, unlike New York City at that time, did not have a significant number of substantial tenement houses or extensive previous tenement house regulation. Unlike The 1901 Tenement Act in New York City which rendered many earlier New York City tenements non-conforming and no longer habitable. The 1902 Chicago Tenement Ordinance became the guide for how new multi-unit housing



NEW YORK CITY TENEMENTS WITH CENTRAL COORIDOR SCHEME



CHICAGO TENEMENTS WITH VERTICAL STAIR HALL SCHEME

Figure 2. New York City and Chicago Type tenements

types could, and should, be designed to meet the latest standards of health and hygiene for multi-unit apartment buildings.

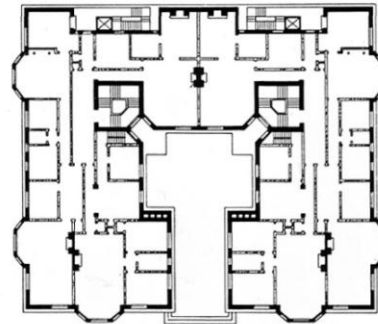
CHICAGO 1871 TO 1902 - FROM THE CONFLAGRATION TO THE TENEMENT HOUSE ORDINANCE

When we think about multi-unit housing precedents in Chicago it is important to remember that the densest portion of Chicago had been completely destroyed by fire in 1871 and the wooden buildings that had been used to quickly rebuild after the fire were rendered redundant as the Central Fire District was implemented and expanded in the years after the fire. [Adams 1903, Hall 1920] There seems to be few significant advances in multi-family housing design in Chicago during the period of 1871 to 1902. However, there were a few important precedents that were built during this period that helped to define the Chicago flat planning approach.

The earliest significant example was the Mecca Flats building which opened in 1891 in time for the World's Columbian Exhibition (Figure 3). The Francis Apartments and the Francisco Terrace apartment building (Figure 3), both from 1895 and designed by Frank Lloyd Wright, are two other important local precedents. All of these local precedents featured courts but only the Francis Apartments also featured vertical stair hall planning similar to later buildings. While the 1902 Chicago Tenement House Ordinance could have been used to produce central corridor type buildings, like those used in New York City, local precedents established the preference for buildings that utilized the vertical stair hall planning strategy.



MECCA FLATS



FRANCIS APARTMENTS



FRANCISCO TERRACE

Figure 3. Meccas Flats, Francis Apartments & Francisco Terrace

SIGNIFICANT PLANNING AND CONSTRUCTION REQUIREMENTS FROM THE CHICAGO 1902 TENEMENT HOUSE ORDINANCE

Construction: All multi-family buildings built within the central fire district had to have a perimeter wall of fire-proof construction, usually masonry. Perimeter walls built to the lot line could not have openings but the Ordinance outlined the required setbacks for perimeter walls with openings (doors & windows) (Figure 4). Buildings that were built to a limit of three stories over a high basement could utilize dimensional lumber for framing within the perimeter of the fire-proof walls. Buildings that were 4 to 5 stories over a high basement had to utilize heavy timber framing within the perimeter of the fire-proof walls, as a minimum. Buildings over 6 stories had to utilize fire-proof framing construction within the perimeter of the fire-proof walls. [Adams 1903]

Sec. 21. Courts—Inner—Sizes of—Lot Line Courts.—The “inner courts” of all new tenement houses defined in Section 1, Paragraph 4, shall have areas and minimum widths in all parts not less than the widths and areas as follows:

Building.	Square Feet.	Least Width.
2 stories	100	6 ft.
3 stories	120	7 ft.
4 stories	160	8 ft.
5 stories	250	12 ft.
6 stories	400	16 ft.
7 stories	625	20 ft.
8 stories	840	24 ft.

“Lot line courts” shall have areas and minimum widths in all parts not less than one-half of those specified in the above table of “inner courts.”

Sec. 22. Courts—Outer—Sizes of—Width Increased.—The “outer courts” of all tenement houses defined in Section 1, Paragraph 4, shall have not less than the following widths for their minimum in all parts:

Building.	Least Width.
2 stories	3 ft.
3 stories	3 ft. 6 in.
4 stories	4 ft.
5 stories	6 ft.
6 stories	8 ft.
7 stories	10 ft.
8 stories	12 ft.

If the “outer court” has windows on each side of the same, the least width given in the above table for “outer courts” shall be doubled for the minimum widths, and where the depth of a court shall exceed three (3) rooms the court shall be made at least one (1) foot wider for each additional room over two (2) rooms from outer or lot line end of court.

Figure 4. Court sizes from the Chicago Tenement House Ordinance

Passive Ventilation and Day-Lighting: All Occupied rooms were required to have a window opening directly to a street, yard or court. Occupied rooms included living rooms, dining room, sleeping rooms and kitchens. According to the 1902 Ordinance toilets and pantries were required to have a window opening directly to a street, yard or court but were also allowed to have a window that opened to a ventilation shaft. [Adams 1903] Later revisions of the Chicago Tenement House Ordinance eliminated the use of ventilation shafts so toilets and pantries were required to have operable windows that opened to a street, yard or court only. [Hall 1920]

Stair Halls: Chicago flat type apartment units are planned around a pair of vertical stair halls. The front main stair hall was enclosed and had to have windows or a skylight that allowed for passive ventilation and day-lighting. The rear service stair

could be open, but covered, and constructed of wood as long as it was built outside of the buildings perimeter fire-proof walls (Figure 5). [Adams 1903]



Figure 5. Secondary open stair: two flat and reverse corner lot building

Sectional Planning: All of these buildings share a common sectional scheme. The Ordinance made a distinction between a cellar (more in the ground than out) and a basement (more out of the ground than in). According to the Ordinance a basement could have occupied space while a cellar was suitable for storage only. [Adams 1903] When we look at a section we realize that there are two primary advantages to elevating the first floor units over a high basement in an urban context. First, the first floor unit is raised over the sidewalk slightly so the occupant has a higher, and more private, vantage point than someone on the sidewalk (Figure 6). And second, a switchback stair (the most common type of stair configuration used in these buildings) will have a landing at the level of the unit on the side away from the street allowing for a very efficient vertical stair hall in plan and section (Figure 6).

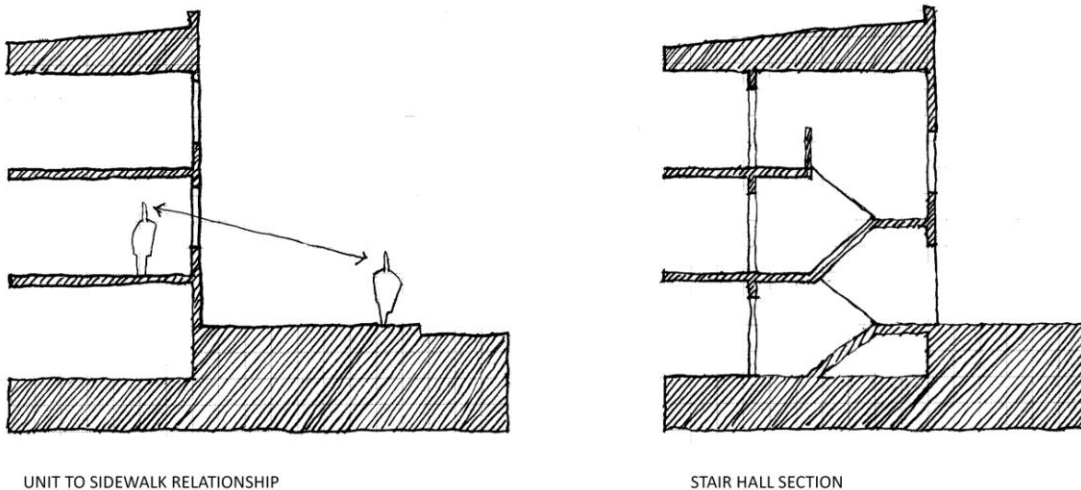


Figure 6. Unit to sidewalk section and stair hall section

FLAT TYPE PLANNING FROM THE BUNGALOW TO THE MID-RISE ELEVATOR BUILDING

I have described how I first became interested in Chicago courtyard apartment buildings and the influences and differences between New York City and Chicago tenement design and regulation. Now I will show how the Chicago flat type planning strategy was applied to a single family bungalow (on a 25' x 125' lot) all the way up to a 10 or 20 story mid-rise elevator building. The various types of residential buildings that utilize flat type planning include: bungalows (single unit), two flats (two units), three flats (three units), four flats (four units), six flats (six units), reverse corner lot buildings (usually nine or more units), half court buildings (usually twelve or more units), courtyard buildings (usually eighteen or more units) and mid-rise elevator buildings (usually two or more larger units per floor).

The Single Stack Types: Bungalows, two flats and three flats are all essentially related in that they all have a typical floor plan that is repeated, along with a pair of vertical stair halls, as many times as necessary in order to get the number of units that is required (Figure 7). In 1902, 25' x 125' lots were common in Chicago so many of the oldest examples of these buildings were built on 25' wide lots. In general, a building of this type built on a 25' wide lot could only have a useable interior width of about 17' when you set the windows back the required 3' from the lot line and allowed for the width of the exterior walls. Even when a room could be extended to the lot line the widest useable inside dimension was only 20' wide which, when you have two rooms across the width, did not generate generous room sizes. The advantages of a 30' lot for this building type quickly became obvious and by the 1920's 30' wide lots were common. By the late 1920's on the far north side, there were even some "jumbo" flats that were designed for 33' and 40' wide lots.



Figure 7. Bungalow, two, three, and six flat types

The Mirrored Stack Types: A two flat that is mirrored about the stair halls becomes a four flat and a three flat that is mirrored about the stair halls becomes a six flat (Figure 7). Because these buildings share a common internal wall the lot width was less of an issue since this configuration limited each unit to a plan that was only one room deep at the middle. While examples of four flats exist, they were not common.

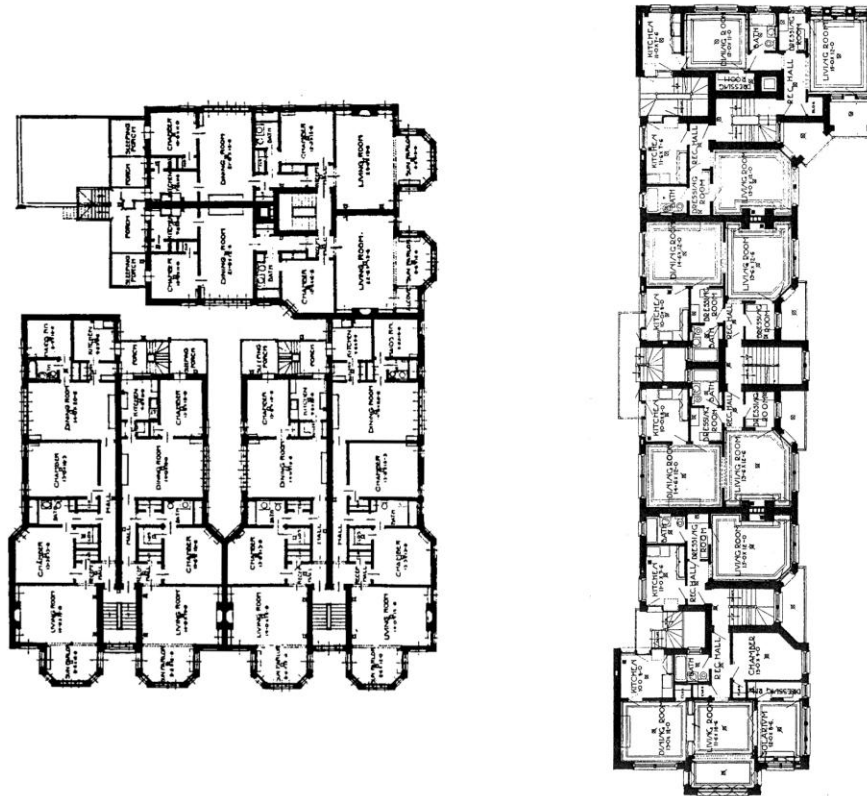
Reverse Corner Lot Types: The 1902 Ordinance allowed a higher density on corner lots because the corner location could provide more direct access to light and ventilation than a mid-block site. Reverse corner lots did not require a set back from the sidewalk on the primary or secondary street frontages. This significantly increased the allowable square footage of a corner lot. Reverse corner lot buildings are generally configured in two ways. First, a reverse corner lot building may be configured by combining a series of two, three or six flats that are configured to face the primary and secondary street frontages (Figure 8). This type of building tended to be located on wider corner lots. Second, there was a bar type configuration that was used for two and three story buildings that tended to be located on narrow corner lots.

Half Court Type: Half court buildings are a mid-block type since reverse corner lot types generate a higher density on a corner lot than a half court building could and the court would serve no purpose since a corner lot already has ample access to day-lighting. Half court buildings take advantage of lot line walls at the front and rear of the lot (Figure 8). The half court type is planned around two side courts as defined in the Ordinance. [Adams 1903] The front side court will often be wider than the minimum dimension allowed by the Ordinance and it will be open to the street at the front. The front court forms the primary public (formal) access for all of the units through the front court and the front stair halls. The rear stairs are accessed from the rear side court, which was usually built to the minimum width allowed by the Ordinance and was open to the alley at the rear.

Courtyard Building Types: There are many possible configurations for the courtyard type but they all share the same conceptual planning principles. If you take a regular street of six flats and push some back to form a court you have the general idea of how a courtyard building is configured (Figure 8). While this doesn't sound like much of a strategy this approach can produce buildings that can be laid out to accommodate a wide variety of lot sizes and configurations. I have found examples of Chicago courtyard buildings on just about every type of site that one can imagine including: mid-block sites, corner lots, deep lots, shallow lots, lots on residential or commercial streets, irregular lots, and finally courtyard buildings that have been adapted to unique contexts (Figure 1).

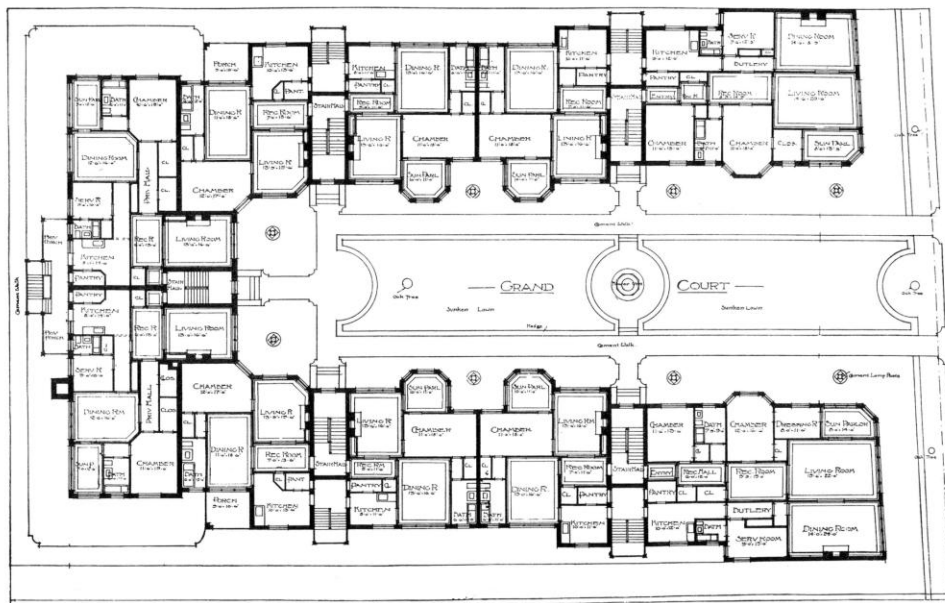
Mid-Rise Elevator Building Types: Mid-rise elevator buildings of 10 to 20 stories tend to have larger units with multiple bedrooms but the same planning principles from the low-rise buildings are still utilized. While the units in these buildings tend to be larger and more luxurious the same planning strategy could be used for a building featuring smaller unit sizes. Some mid-rise buildings have just one unit per floor like a two or three flat and some have two units per floor like a six flat. However, there are buildings with larger footprints that have multiple elevator and stair halls (Figure 9). The Chicago flat planning strategy has even been used on a

mid-rise elevator building that features duplex units with double height living rooms (Figure 10).



REVERSE CORNER LOT TYPE

HALF COURT TYPE



COURTYARD TYPE

Figure 8. Reverse corner lot, half court and courtyard types

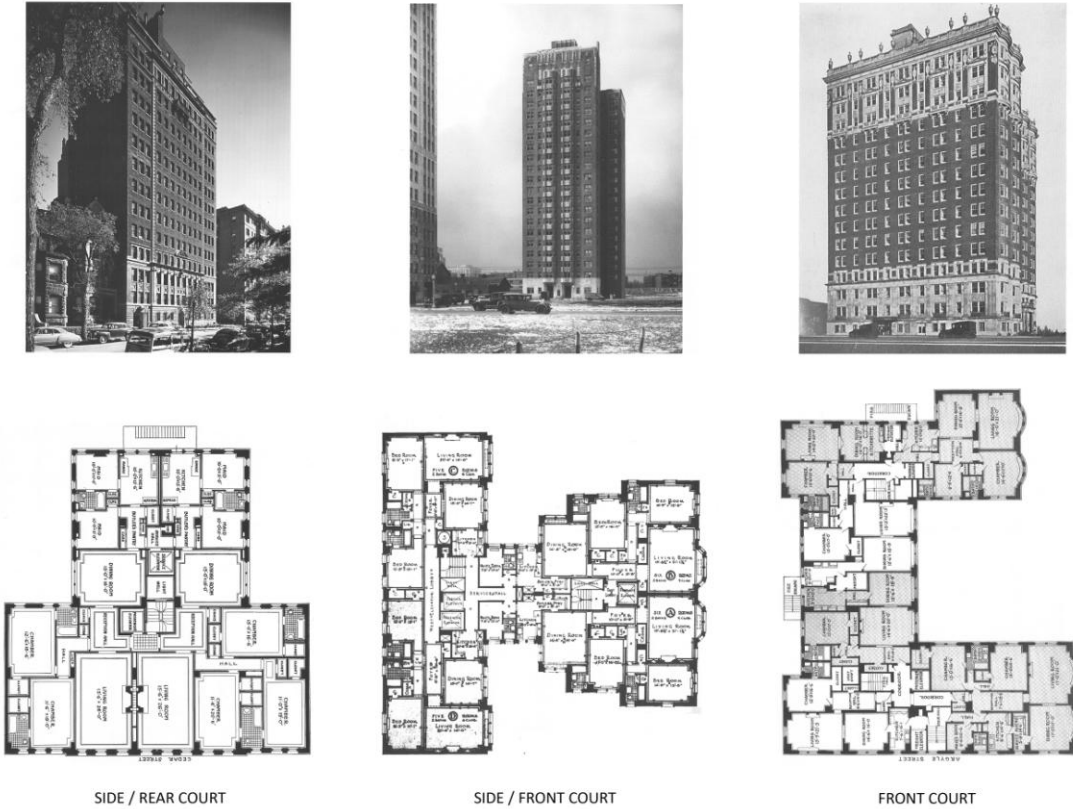


Figure 9. Mid-rise elevator flat type apartment buildings

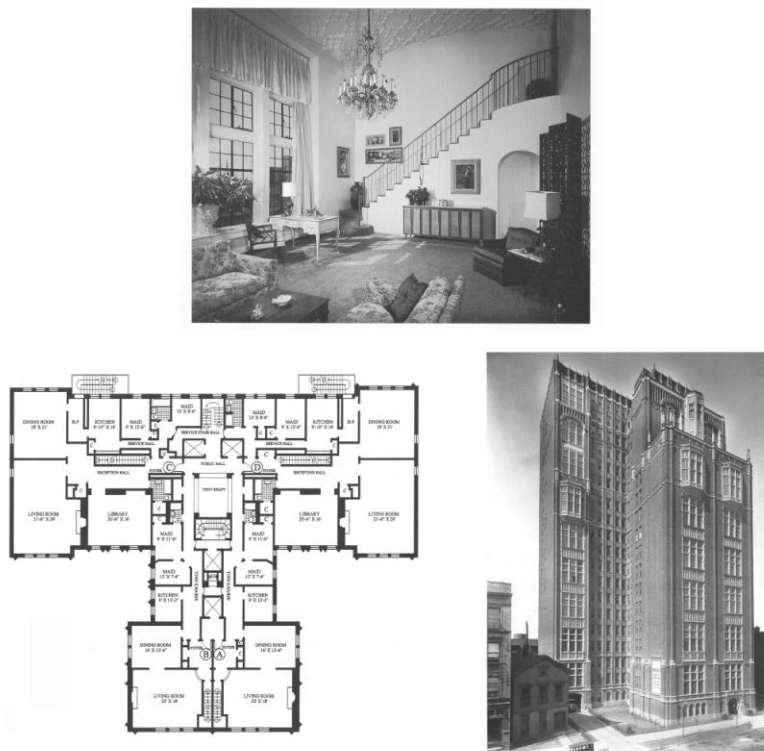


Figure 10. Mid-rise elevator building with duplex (two story) units

CONCLUSION

The period from 1871 (Chicago fire) until 1902 (Chicago's first Tenement House Ordinance) was characterized by the minimally regulated and ultimately temporary rebuilding after the fire but this period did produce a few important local multi-unit housing planning precedents. The period from 1902 until 1929 (stock market crash) was perhaps the most significant period for multi-unit housing development in Chicago's history. In many regards, the apartment buildings built during this period still define the character of many of Chicago's neighborhoods. This was a unique period because home owners and apartment dwellers demanded state of the art housing amenities (the same amenities we still demand today) and the planning and design principles embedded in the 1902 Ordinance guaranteed that every room, in every unit, had access to natural ventilation and day-lighting. In 1902 mechanical ventilation was uncommon and air-conditioning did not exist on a practical scale for residential buildings so these buildings form a type of reference point for the height of passive ventilation and day-lighting design in America. When you think about the design and planning precedents that you might utilize for your sustainable housing projects you should consider utilizing the Chicago flat planning approach.

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