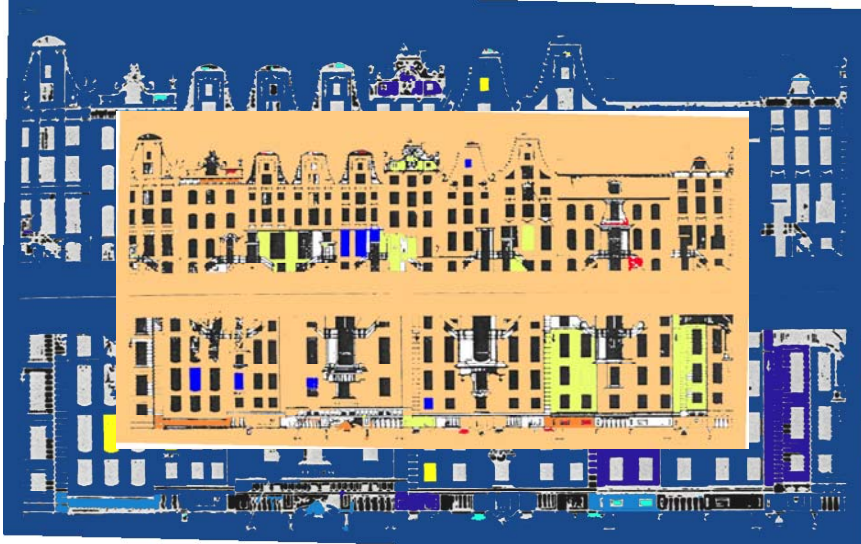


Daylighting in Row Housing



Daylighting in Row houses

Before plunging into the promising future of row housing—we'll come to that in a minute -- I thought we should explore a bit of Row House history paying particular attention to daylighting issues.

The truth is you can't see pictures of Old New York without noticing the streetscapes of look a like brownstones, crammed shoulder to shoulder in every neighborhood – from the depths of the Lower East Side to the posh citadels of power in upper Manhattan and beyond. Harlem is busy shining up its long-neglected classic row-housing streets as we speak.

The Row House phenomenon exists in every major city in America.

My personal love affair with Row Houses began in 1977 when I moved from College to New York City. I was just beginning my career as a designer and with the help of the NY Times real estate section I found a tiny one-bedroom apartment that I shared with a high school friend. Looking out from our ground floor apartment, of a 5-storey brownstone on West 11th Street. This is the heart of Greenwich Village -- that thriving legendary downtown Mecca artists made famous in the 1920's.

Winding streets are filled with Federal and Georgian style Row Houses. Once single family homes, many have been converted, floor-by-floor, into desirable (if tiny—and dark!) apartments.

Each evening when returning from work it gave me such pleasure to turn the corner on to West 11th Street. The perfect vantage point for studying the many aspects of Row House architecture. I soon discovered that a building down the street from me had a notorious past. It was a replacement structure for a Federal Style Town House that had been virtually destroyed in 1970. A bomb being assembled by Weathermen members had exploded prematurely and poof! In an instant a century-old home was erased. But not completely, walls of Row Houses are, of course, somewhat supported by the houses on either side—in this case, the surviving walls gave the new architects something to build on.

Hugh Hardy of Hardy Holzman Pfeifer was the architect selected to create a design for the replacement. As usual in such cases, once the new design became public, it caused an uproar. Stubborn preservationists insisted that the original Federal building style should be duplicated. These privileged souls -- among Manhattan's elite to own a single-family Row House in Greenwich Village -- complained that the new "look" did not fit into the street line. Instead of the flat- façade of its neighbors, the new front brazenly sported an angular bay window that jutted out over the sidewalk.

Never mind that this bold all-encompassing window would flood the parlor floor with welcome sunshine, die-hard traditionalists forced Hardy to alter his original design, which might have brought in even greater streams of sunlight into the upper stories.

In any case, Hardy's plan, once accepted, gave birth to a new kind of row house where tall windows would drench the interior with natural light. I walked by the Hardy house every day at that time and always stopped to admire it. The new owners, aware of the stares of passersby, seemed intent on entertaining us with amusing scenes. Once a huge Teddy Bear pressed his nose against the window, seeming to send a message to all us Nosy Parkers. Perhaps Teddy was the owner's attempt to mock anyone invading his space with his or her curious eyes.

In 1988 I decided to visit the firm of HHP. I wanted to know more about this house. I also researched the story, curious to learn what New York's architectural pundits had to say. The critic, Carter B. Horsley, wrote an historic commentary regarding the site and the dispute: "The former Federal Style townhouse at 18 West 11 Street exploded in 1970 when a radical group's bomb factory mal-functioned. The new and rather modern adaptation by Hugh Hardy of Hardy Holzman Pfeiffer was completed in 1978 with angular, redbrick façade." The New School University anchors the west end of the block and just across the Avenue you'll find P. S. 41, one of the city's finest public schools. There's a small magazine store and a quaint Portuguese cemetery on the corner, all this just one block up from the Jefferson Market, a famous landmark. "But," asks Horsley, "How did the access to daylight on

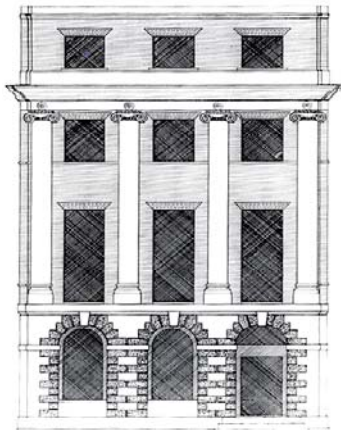
the ground floor influence this building's unusual form while all the neighboring building's façades were flat as pancakes?"
Good question.

The well known Paul Goldberger, commented in his recent weekly blog, on the design, from a historical and urban viewpoint:

When Hugh Hardy designed a townhouse to replace the Federal house that was tragically destroyed in the Weathermen bombing of 1970. Hardy's design, which I must say now appears not radical but almost quaint, was quite violently objected to by some neighbors, who wanted a mock-Federal (I thought it was Greek Revival?) house put back, just like the one that had been destroyed. Hardy would have nothing of archeological replication, and insisted on something different – not so much to be different, he argued, as to mark the event, to leave some sign that something had happened to disrupt the streetscape, so that the new house by deliberately breaking up the purity of the old row would be a de facto acknowledgement of the tragedy.

Goldberger offered an opinion that ratified Hardy's choice to break with tradition (but not completely) by considerably altering the original design. Significantly, the alteration was designed to maximize daylight in the interior space.

New York Row houses Greek Revival, and Federal Styles



The Row House and Natural Light

Natural light filtering through a window plays on the surfaces of a room, casting shadows that move across a walls and ceilings, penetrating light forms in different shapes and sizes, – as morning turns to night – it's almost a living thing if we compare it to the

steady light from a conventional electric light fixture. We respond to that flickering unsteadiness, we like it. It reminds us of the sun and mysterious unpredictable nature. However, for the most part builders of row houses have, it seems, ignored the issue of natural light. There were always a few buildings where architects have fought to maximize the effects of natural light in their designs—even when the houses were only for poor people. It would be a shame if we didn't research and reclaim these daylighting strategies today – even as we strive to create new ones. Advanced technologies give us fresh options, and in the interest of energy conservation the building community is now welcoming daylighting methods.

While a Row House offers the advantage of using less land and fewer resources than a detached house, it has one major flaw: only the front and back walls allow windows. Nevertheless, the Row House has a long-standing tradition in this country. Originally an invention to house the poor, (cheaper by the dozen to build and to hell with natural light) has become the focus today of urban planners who see this kind of dwelling as a clever way of curbing urban sprawl and conserving environmental resources.

As designers we are challenged. We must discover ways of opening up the deep inside spaces of row houses to the magic play of daylight.

Although historically, row housing developed and flourished within cities, now we see the Row House springing up in the most unlikely places; as a practical answer to the urgent housing needs of commuters and exurbanites. Rather than building more costly detached homes, developers are offering condos: one or two-story houses that share walls with neighbors. Let's face it. "Townhouses" are Row Houses – so now we are confronted with the same problem, the light-starved interiors of olden days.

How important is light? Very. Realtors advise sellers to turn on lamps and room lights before letting a prospective buyer in the door – even if it's high noon. Nothing kills a sale quicker than a gloomy interior. Rooms seem to shrink in size when the edges and corners are dark. The mood is somber, it's a turn-off, it's depressing.

Natural window light is even more desirable. The warmth and aesthetic delight we feel in a sunlit room can make a Row House feel like home. Hardy recognized this fact when he insisted on an expansive over-scaled bay window in his design. He sensed that sometimes you have to exaggerate a theme in order to achieve your goal.

And that's what we need to do now that row houses – a.k.a. Town Houses -- are becoming the norm. Call them "townhouses" or condos. Whatever. They have a long history and they're here to stay. Hopefully, in the best possible light!

Architects are great borrowers. So it's no surprise that for a hundred years American architects have absorbed the classy embellishments they observed in magnificent European townhouses and stuck them on their buildings. You'll find examples of Federal, Georgian, Victorian and Greek revival Row Houses all over New York City today...as well as in all the other major cities of the US, which were built at the turn of the Nineteenth Century.

It's certainly no accident that our streets are lined with historic Row Houses. Imagine the building boom that was going on after the Civil War when we began to create our cities. The Industrial Age was transforming the way we lived. Every factory needed workers -- and workers needed places to live. Eventually Labor's struggles in for better working conditions spilled over into better housing.



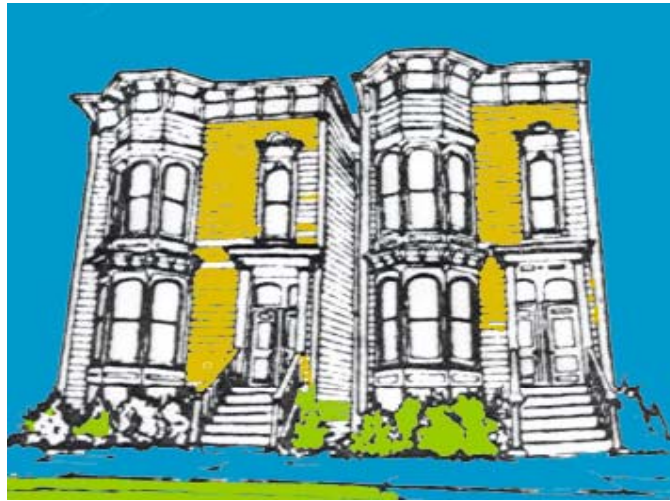
Tyneside, England

Nevertheless, you may be sure that bringing sunlight (and fresh air) into a worker's home was scarcely a priority. Not in America, and not in London or Amsterdam either. Tyneside, the famous row housing for workers in London, and worker row houses in Amsterdam were all gloomy places. In Europe also, daylight for working-class row houses was not a serious concern.

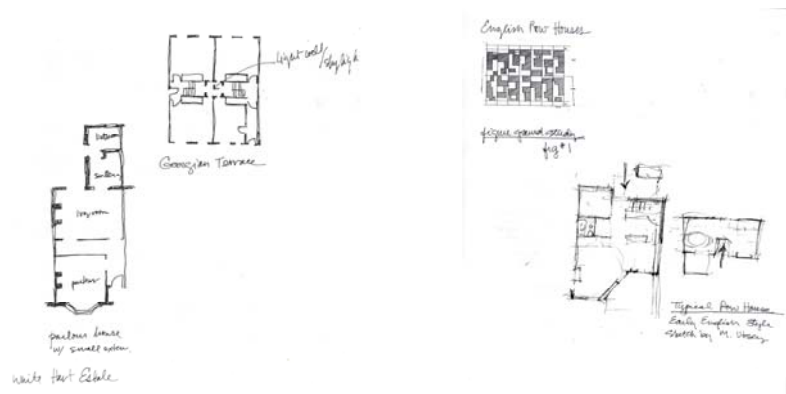


Tyneside, England

San Francisco Row houses



One exception to the well-nigh universally ignored human need for natural light inside the house is the San Francisco Row House. These remarkably airy and light-filled treasures were built during the California gold rush (gold was discovered in 1849)—and, for the most part, they were intended as working class accommodations. Today in San Francisco, the Row House remains the dominant form of housing and is revered for its Victorian charm.



The Classical Style in England's domestic row houses

We need to go overseas and back in time by several centuries to find architecture that promised daylighting in interior spaces. The Palladian Revival, popularized by the architect Inigo Jones in the early 1600s, had the virtue of larger window openings – and they began to appear in English row houses. The big, big window was revolutionary. Royal Proclamations in the early 17th century required new houses in London to be built of brick or stone though for the framing out of windows, wood was still permitted (though supplies were limited, most of England was lumbered out).

On through the Georgian period during the 18th century, row housing usually followed this plan: the ground floor had moderately sized rectangular windows and second-level windows often went from floor to ceiling. Sunlight flooded in giving rise to the use of attractive shutters that let you regulate the amount of light you wanted. Shutters were sophisticated contraptions, divided into sections that could be operated independently. Windows were often shaded with awnings that arched over openings diffusing the light before it reached inside. Within, windows were dressed in luxurious draperies – a practical way to control sunlight and one that allowed fashionable folk to show off their refined tastes.

The new “openness” – homes with fresh air and sunlight became status symbols. The theme was echoed throughout the house. Parlor windows would commonly open onto small terraces made accessible by triple sashes. Doorways between interior rooms were designed with very wide openings so that two rooms could almost become one, ideal for dancing parties. For privacy, you

could close such a doorway with pocket doors or French folding doors.

These Georgian designers knew what they were doing – they understood the value of letting in the light. Listen to Methesius “The abundant introduction of light, by means of large panes of glass adds a cheerfulness formerly unknown....” (Methesius P 145)

John Soane Museum, London

FIGURE 130



Large panes of glass were available (thanks to developing technology) and could be mass-produced. Large windows were no longer a luxury only the rich could afford. Designers and architects were quick to exploit the availability of these large glass sheets – they appreciated the crystalline properties of glass.

This was the age of London’s famous Crystal Palace, a building and a sensation at the time -- virtually one of the wonders of the world. It was made entirely of glass. At the same time, elaborate greenhouses became possible...popular among those who could afford one. Glass was being celebrated – in greenhouses, vitrines, showcases for bibelots -- all made possible by new cheaper glass-making technology. Four panes of sheet glass could now replace the twelve panes of glass in a Georgian Regency sash window. And along with the rage for big glass windows came verandas and balconies where light and fresh air could be tasted by simply stepping through the window.

Fashion demands constant change. Everything old becomes new again. And thus it was that towards the latter part of the 19th century, Gothic and Domestic Revivalists began to shrink the size

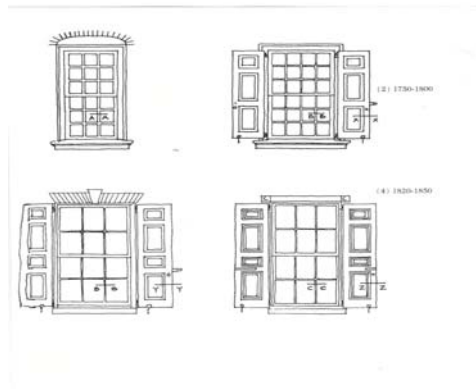
of their windows. Cheerful large windows gave way to Gothic charm and small windows that shed a delicate light on cozy rooms. Still later, Victorian/Edwardian styles took a step backwards and used the large glass pane for the lower portion of the sash window and placed smaller panes of glass above.

Sir John Soane, 1753-1837 “a master of space and light” is one of the most revered architects of his time. His marvelous “breakfast room” in his own row house, built in the early 1800’s, is one of the most dazzling examples of daylight maneuvers. He masterfully played with texture, form, and shadow. Reflecting and bouncing light so that it defined ornate plaster carvings. The ceilings and walls literally seem to come alive.

Once inside the John Soane Museum the otherwise discrete façade gives way to a fanciful poetic architecture. In describing his famous breakfast room Soane wrote: “In the center rises a spherical ceiling, springing from four segmental arches, supported by the same number of pilasters, forming a rich canopy.

“The various coloured lights cast by concealed skylights, the mirrors, the view he continued: “ a succession of those fanciful effects which constitute the poetry of architecture:

Philip Johnson declared Soane: “a ceiling architect”. Royal Academy of Art, pg. 62



We should talk about the sash window. Developed in Holland during the 17th century -- a fairly modern invention -- it became an important element in American row house design. On the parlor floor sash windows were often divided, as mentioned earlier, into three sections allowing access to outside terraces. To create a large opening you could step through – though you might have to duck your head to keep from bumping -- you pushed the bottom two sashes towards the top of the window frame (they slid past each other like sliding doors).

John Soane Museum, London



The Ancient Lights Doctrine

Howard Davis, in his article, [“The Future of Ancient Lights”](#) discusses the rising need in 18th century England to measure daylight and the process by which British courts assessed light distribution within buildings. Through case studies, Davis illustrates several ways the court determined whether a room or a building received enough natural light. A distinction was made between direct sunlight, diffuse natural light and obstruction of view. Diffuse light was considered acceptable.

The courts sought to analyze a building’s quality of daylight by sending officers to visit building sites where they calculated daylight distribution. One guideline measured the critical level of light within a room as it passed through a windowpane two feet to nine feet above the floor. “The line that marked an area as ‘too dark’ became known as the ‘grumble line’ because at that point, ‘If you are a reasonable man you grumble that you cannot read.’ Davis, page 145

Another calculation took into account reflections from exterior surfaces. This was called the “sky factor.” It measured the amount of visual sky in view using Waldram diagrams. Sky factors were used mainly for guidance. Most of the advances in housing rights during this period -- remember this was the 18th Century -- happened in parallel all over Europe and the United States. British “right to light” regulations, not surprisingly, influenced US policy makers. After Independence, light laws in America were adopted state by state. “For several decades after 1776, the Ancient Lights Doctrine was a part of American law....” Davis, page 144.

John Soane Museum, London

- Breakfast room



Tragically for us, light's beneficial qualities in housing were soon to be legally challenged-- and demolished. Davis cites the crucial case that set aside the protections of the Ancient Lights Doctrine. Parker v. Foote (a case heard in a New York court in 1838) reversed the Lights Doctrine. Says Davis: "The perils of American expansionism and our view of land rights came to play an important role in the decision-making process of the courts of that time." That's putting it mildly. Listen to what the court said (and remember, the subject here is windows):

"The learned English judges who have laid down this doctrine have not told us upon what principle or analogy in the law it can be maintained. They tell us that a man may build at the extremity of his own land and that he may lawfully have such windows looking out upon the lands of his neighbor.... The reason why he may lawfully have such windows, must be because he does his neighbor no wrong... and yet somehow or other, by the exercise of lawful right in his own land for years, he acquires, beneficial interest in the land of his neighbor... How much land can thus be rendered useless to the owner remains to be settled.

There is, I think, no principle upon which the modern English doctrine of the subject of lights can be supported... It is an anomaly in the law. It may do well enough in England: and I can see that it has recently been Sanctioned with some qualification by an Act of Parliament... but it cannot be applied in the growing cities and villages of this country, without working in the most mischievous consequences." (Davis, page 147)

Eventually the Ancient Lights Doctrine was rejected across the country. Parker v. Foote was cited as precedent. This arrogant, scurrilous law set the stage for a kind of "dark ages" in housing,

particularly row housing. Parker v. Foote, eagerly followed to the letter by nineteenth century developers, brought terrible living conditions to American cities, says Davis.

Apartment dwellings became dark and airless places. Whatever backyards existed simply disappeared as building extensions gobbled them up. Despite activism and protest, it was not until 1916 that a comprehensive zoning law in New York was instigated. There was now some hope of alleviating the suffering of its poorer inhabitants squashed into crowded airless buildings we now call slums. New ordinances regulated land use, density, nuisance activities -- and through setback regulations -- the height and bulk of a building on its lot.

However, whatever improvements might have been hoped for, the truth is, the new regulations did not address the lack of daylight or any other environmental or health issues.

Perhaps the Ancient Lights Doctrine was still being kicked around in urban planning circles. Setback regulations originally designated by the Doctrine continued to influence building plans. Here we see from the Ancient Lights Doctrine, a diagram illustrating a 65-foot by 85-foot plat with a 20-foot setback.

John Soane Museum, London

- Floor plans



Writing in his book, "The English Terrace House," Stefan Methesius introduced a new concept directly related to sunlight. He named it an "aspect" or "orientation." Methesius says: "According to the functions of the different rooms, ensuring for example the presence of the morning sun in the breakfast room... a new concern for light and health generally affected all types of

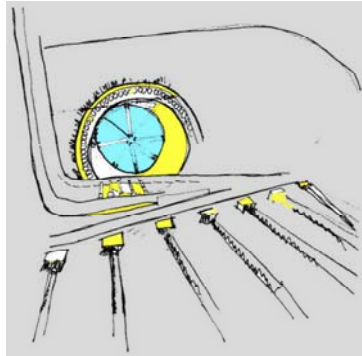
Daylighting in Row Housing, Presented at Neo Con East, 9.14.05 dwellings.” (Methesius page 47) Methesius goes on to say that the modern craving for light and fresh air simply did not exist before the nineteenth century. It was then that the idea that fresh air and sunshine were important ingredients for good health. It spread like wildfire. This new appreciation of sun and nature gave birth to the invention of the seaside resort and health spas. Thus it was that in 1851, in order to facilitate the rapid development of grand glass-encrusted buildings, the window tax and duty on glass was abolished.

How did the new fresh-air-and-sunlight ideas impact row housing? Let’s see. By the 1820’s a typical row house was generally thirty-five to forty feet long and twenty to twenty-five feet wide. Buildings were just two rooms deep “for the sake of adequate light and ventilation,” according to Lockwood. “The basement ceiling was sometimes as low as six and a half feet. Later on basement ceilings were raised by excavation: that is the floors were lowered.” Lockwood, page 209 Basements had small windows facing the street that was slightly above them.

As for the rear of the house, a window opening onto a stairway placed between the first and second floors (leading to the bedrooms) allowed sunlight to penetrate some distance inside. Remember, we’re still talking about row houses being put up in the 1820s and beyond.

Now as cities were in the process of being created, we find the formerly rude row house being modified and embellished for the rising middle class: the merchants and professionals of the time. In some instances the parlor floor was devoted to the owner’s business — these rooms served as his reception area for clients. Personal activities and family life was relegated to the upper floors. In most New York row houses you’d find the kitchen in the basement — you can still see that’s true if you walk down the a street on the Upper East Side and peer into the area beneath the front stoop. The dining room was usually adjacent to the kitchen — but not anymore. Even then, the dining room was sometimes located on the parlor floor. You’ve heard of dumbwaiters? These mini elevators allowed kitchen staff to send their culinary delights upwards. Minus such a device, regular meals were mostly served closer to the kitchen, and only when guests were entertained was the parlor floor used.

I’ve made it my pleasant duty — in the interests of research — to explore many Row Houses, especially in the Brooklyn Heights area where they are still retained as single-family dwellings. The kitchens and dining rooms are surprisingly cheerful and intimate. When properly sited the basement level receives more than adequate daylight.



Planning Issues in New York City

As is true throughout the history of housing practices in New York City, architects involved with housing for the poor were typically liberals engaged with reform movements and subsequent legislation. According to Richard Plunz, architectural breakthroughs were indirectly the result of such legislation.

In his book [The History of Housing in New York City](#), Plunz discusses the affect of the Tenement House Act of 1879 (and earlier revisions to the Housing Act of 1867) on building design. It was these laws -- and a design competition -- that gave birth to the so-called "dumbbell" tenement.

These laws stated that no new tenement house could occupy more than 65 percent of a 25 by 100 foot lot. The practice of tenement back building was prohibited unless adequate light and ventilation were maintained. More water closets were required than in 1867. Unfortunately, the Board of Health had little power to enforce these specific provisions. As a consequence, lot coverage for the dumbbell tenement also commonly called the "old law tenement") was usually a whopping 80 percent of a 25 by 100 foot lot (page 24 Plunz) rather than the law-designated 65 percent coverage. Even so, the "dumbbell" tenement somewhat improved the earlier tenement where people were literally warehoused -- and diseases, particularly tuberculosis, ran rampant.



The San Francisco Row House

Continuing our focus on daylighting in row houses, let's return to the San Francisco Row House and examine it through the eyes of Anne Vernez Moudon. In her book Built for Change: Neighborhood Architecture in San Francisco Moudon writes: "Not only do semi-detached houses have some of the individuality that characterizes a detached house, but they also open up the streetscape to views of sides and backyards and offer a quality of light and ventilation that only corner houses afford in row house arrangements."

Moudon goes on to discuss the effectiveness of San Francisco row-house planners in creating natural light penetration, even in some cases to the center of a building called the "heart of darkness." A spacious light well created by a skylight illuminated central rooms and provided ventilation. In San Francisco most lots measure 20 (or more) feet wide by 137-feet long. This size lot permits very deep house forms. Most row houses have six rooms from front to back leaving plenty of room for a good-sized garden.

Moudon goes on to explain how flexible the Victorian box is to switching designated uses. The parlor room usually takes its place in front of the box, its bay windows make it the brightest room in the house and the view of the street gives it a more public character. Bedrooms in larger houses may also occupy coveted upper-story front rooms, particularly in wider lots. As for the middle room, because it borrows light from both front and rear rooms, it makes a perfectly comfortable room for a variety of purposes. A wide threshold between rooms makes it possible, as mentioned earlier, to combine the rooms into one large space.



Crutcher/Roller, Residence, Floor Plan

I was fortunate to be the guest of friends (Crutcher and Roller) who live in just such a residence. This couple uses the front room as a studio and the middle room as a sitting room or parlor. They had intended to make the backroom their dining room, however it's become a sitting room as well. It's easy to switch the roles that each room plays. The type of light the room receives is always a determining factor. In the Crutcher/Roller flat, the fact that the front room faces south makes it ideal as a studio. For the bedroom, the quieter garden-facing side, a northern exposure, was an obvious choice. When I visited other flats, I saw that some couples have reversed this arrangement.

You can change a room's function without remodeling, however, you have even more flexibility when you remodel. By removing a single-loaded corridor, a room that spans the full width of the house may be created. Skylights have been installed and entire walls removed to adjoining rooms.

I saw some of these changes as a visitor to the Seal residence in Potrero Hill. The Seals had installed skylights and restored ceilings and walls to the original plaster. They also removed doors between rooms to create a feeling of light and openness.

The early development of San Francisco gave us so many beautiful row houses and continues to define the city. As J. B. Jackson noted, while the larger Eastern cities had given up building low-cost family dwellings and were erecting multi-family tenements or expensive row houses, San Francisco was producing unique residential forms to suit a specialized market.

Sophisticated construction strategies such as balloon framing (were efficient. Party walls were bearing walls, however internal partitions were not making room size flexible. You can see the advantages of this construction method, it allows for adaptability, a concept central to Moudon's theme. In fact, the flexibility inherent in this building form is responsible for the form's long life. Even so, the problem of dark internal zones (especially in ground-floor flats) has not been completely resolved. The introduction of light tubes and the partial removal of corridor walls are, at present,

Daylighting in Row Housing, Presented at Neo Con East, 9.14.05
effective in bringing more light to buildings sited on deep, narrow lots. Of course, electric fixtures, though not “natural” light, can certainly cast a warm glow and dispel any hint of gloom.

Increased code standards dictate that habitable spaces be lit by daylight and be properly ventilated. At the same time, circulation spaces are no longer entities within dwellings; in an effort to save space and control costs, they have virtually been eliminated.

My Case Studies in San Francisco

In this portion of my research, I chose to examine the form of the Row House, as it exists in San Francisco. These picturesque houses that seem to stagger their way up the city’s steep streets have become, along with the Golden Gate Bridge, the signature feature of this lovely city.

Although the original city plan of San Francisco paid little attention to site and view exposures, most of the housing has generally good access to natural light. New York City, incidentally, was not so lucky. Developers building on this tight little island where land was sky high were almost forced to build densely packed housing – even those 12-story apartment buildings on posh Park Avenue are tightly crammed together.



Potrero Hill Residence, Floor Plan and Section

Another comparison between the two cities involves how weather-wise their buildings are (or, are not). Visiting a wooden San Francisco Row House on a 40-degree day made me shiver with the cold. Turns out, little or no insulation was used during original construction on much of San Francisco’s housing—and central heating was non-existent. Perhaps early California settlers were lulled into thinking that the Golden State was sunny from end to

end. I go fully armed with sweaters, jackets and cozy scarves whenever I visit.

Because San Francisco sits on a peninsula with a bay on one side and the ocean on the other it's a misty city. It's as foggy as London. Houses need to be insulated against the cold. However, the old row houses were poorly constructed and inadequately insulated. In New York, tenement flats used a higher grade of construction materials, heating was centralized and outer walls were better insulated.

Unless a SF row house has been remodeled—including up-to-code insulation -- chances are it suffers significant heat loss during winter months and you'll be tucked up in sweaters! Today both new housing and restorations must meet city standards regulated by strict codes. For example, codes require builders, or an owner upgrading a Victorian row house, to install R-11 type insulation to curb heat loss. San Francisco along with every other American city has responded to the imperative to conserve energy by initiating new building codes that focus on environmental concerns. But how do you get people to comply with these restrictions?

As for ventilation and the control of direct sunlight, most SF row houses built in the last ten to twenty years continued to ignore these issues. Even when adding on a building extension, so much a part of a renovation, designers have failed to consider these features. For example, many owners have gaily added greenhouses, skylights and sunrooms without a thought to ventilation or ways to shade direct sunlight. Yet strategies for controlling these problems do exist.

For example, the owners of the 20-year-old house I visited on Potrero Hill had attached large wooden louvers to the outside of a multi-windowed West-facing front wall. Whenever you wanted to adjust the amount of light coming in, you cranked a large wheel inside the room, which moved the shutters, this way and that. These louvers not only controlled light, when necessary they could secure privacy.

In the original case-study portion of my research, I chose two San Francisco row houses. I lived in one house for several months, which allowed me to assess their specific virtues and problems.

Significantly, I discovered that natural light was a determining factor in the way these people felt about their homes. They were, of course, deeply affected by how dark or light their spaces tended to be and they organized their space and activities accordingly. The two residences differed significantly in their access to light: one had good natural light, the other did not.

House Number One

The house that my friends Colette Crutcher and Mark Roller lived in when I began my research was built as a multi-family row house made up of “flats.” Located on 16th Street, it was oriented on an East/West axis. I used this Crutcher/Roller “flat” in an original study done in 1994. Subsequently, the couple purchased a single-family row house. This move allowed me to compare the two buildings, up close and personal.

Having become homeowners, this couple forged ahead and began remodeling their small row house in the Bernal Heights district. An addition was added in back that expands their view. They also introduced various daylighting strategies that make their house far superior in brightness to the old “flat.”

That old “flat” reflected the typical style of multi-family housing stock in San Francisco. Originally, it had consisted of four flats, one per floor, but was subsequently divided into even smaller units. My friends occupied a ground floor “flat” that had not been subdivided. Their building runs on a North/South axis with their parlor facing south. All the rooms in the flat run off a long dark foyer. The front two rooms blessed with southern light became their favorite rooms. Nevertheless, because this was a ground floor flat, the light received through the front windows was restricted. Despite two light wells, one located at the bathroom and the other between the two bedrooms, these areas received almost no natural light. Because of the extreme narrowness of the light shaft, which gave no way for sunlight to penetrate the small window openings. The bedrooms are both small and dark. The parlor and dining room with their greater share of natural light were the living areas most used for entertaining and family gatherings. Mark Roller suggested that the flat’s glorious ornate façade and generous entrance areas reflected Victorian concern with showy outward appearances whereas the awkward interior spaces -- bedrooms were not much more than sleeping alcoves -- received scant attention.

House Number Two

My second case study was a row house on Potrero Street. This house, oriented on an East/West axis, was originally built as a single-family row house and remains so today. The main living area is on the highest story and thus has the greatest access to natural light. Originally the house was made up of a single story with a sub-basement level underneath, and a cellar below that. But over the years owners of these row houses have finished off the basement level and built separate rental units or in the case of the Seals added additional bedrooms.

As you see, the Potrero house is one of seven little row houses built into the side of a hill. This positioning on a steep hill has the effect of opening up the lower levels to more light than usual. The house plan diverges from the traditional stacking organization of standard row houses where public activities were relegated to the lower stories and private to the higher levels. In the Potrero house scenario, bedrooms located at ground-floor level actually have adequate light because of the way the building is sited. These Potrero Street row houses look small and petite from the street side. However, as the site drops back towards the end of the site, the houses reach over three stories high. Bedrooms on the street side receive western light through the use of setbacks.

The owner, Eva Seal, complained to me of a “hot” kitchen, associated with its western exposure. The previous owner had added a sloped glazing and a large window separating the back porch from the kitchen. These windows contributed to heat build-up. Eva’s father-in-law refused to complain, saying that he found the kitchen perfectly comfortable for most of the year. Eva, who did most of the cooking, disagreed! Another remodeling boo-boo involved the installation of a non-operable horizontal skylight, which the Seals added to both the kitchen and dining rooms. By 4 p.m. on an 80-degree day, the kitchen could heat up to over 90 degrees. A ceiling fan helps but the situation requires a better solution.

As I had already lived for two months at the 16th Street row house (where I conducted my initial case study), I began to believe, in terms of siting, that a North/South alignment is not as accessible to light as I had first assumed. As John Reynolds emphasizes in his *Mechanical and Electrical Equipment for Buildings*, “when designing for southern exposure the building should be long and skinny with the longitudinal axis on an east/west axis. If however the situation were reversed and the narrow end is facing south the benefits of southern light are not fully realized.”

If a row house runs lengthwise on an East/West axis, then there is no southern exposure; the wall facing south would be a sidewall with no exposure.]

What is it about light hitting the front of a row house? Where does the light land? High up? Low down? It may seem counter-intuitive, but the ground floor of a row house gets less light than do upper floors. Why? Because upper floors rise higher above the street, they are more exposed to light. Lower levels tend to be in shadow as they lie in the “bottom” of the street “canyon.” Upper floors also have the advantage of capturing natural light through skylights and light wells.

As we know, seasonal changes also affect the path of sunlight streaming in a window. The tenants of the 16th Street house reported to me that, strangely, it was during the winter when the sun is lower in the sky that they experienced the brightest and

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most penetrating light in their parlor. By contrast, the high-riding summertime sun had a much narrower reach.



John Reynolds in [Mechanical and Electrical Equipment for Buildings](#) discusses the sun's journey in the sky as it affects all seasons and all latitudes. "The sun's altitude is highest in the summer, lowest in the winter and in between in the spring and fall. This fact, coupled with shorter winter days, leads to an apparent rapid motion of the sun across the horizon in the winter and the apparent slow motion of the sun in the summer." (Reynolds page 971) Clearly then, in attempting to maximize the possibilities of daylighting in a row house, we must consider the sun's path – in all seasons -- in relation to our building's site and design.

Even weather conditions such as rain and fog affect the way light hits a building. San Francisco, as we know, lies between a bay and the Pacific Ocean. Rubbing shoulders with the sea brings fog into the city's streets. Fog that rolls in at night and generally leaves before noon gives the city its magical and ethereal quality. Fog diffuses the sun's light, softening it and banishing harsh shadows. In San Francisco that delicate light seems to lend row houses a special ambience.

Back to our discussion of siting and its relationship to light, let's take a look at Corbusier's Habitat de Unite. Corbusier sited his buildings on a North/South axis so that the units were facing east and west. This gifted architect controlled light penetration and heat gain on the western elevation by use of his bris de sole panels, which diffuse light and interrupt heat radiation. These panels hung outside the building and diffused light before it penetrated into the interior of the building. Corbusier understood the human need for exposure to direct sunlight and a perception of solar movement. He composed his designs and cited his buildings in such a way as to satisfy this universal need.

So... what about the two inoperable horizontal skylights installed by the Seal family in their row house? Were these openings successful as a model of daylighting? Yes...and no. True, they provided more light. But there was a downside. They made the kitchen hot. In the living room, which faces east, you had another problem: Glare! So much light pouring out of the skylight interfered with TV watching, for example.

By making some rough calculations I found that the daylighting factors in the dining room, which also had a skylight, was remarkably similar to the daylighting factors in the living room. The question was: Could the glare in the living room be reduced? Several possibilities existed. One was to insert light tubes through the roof that would wash the walls adjacent to the bay windows with light. Another was to put a long thin roof monitor in place to wash the west wall of the living room. These strategies will evenly distribute diffused light during the morning hours--in the afternoon they will flow with direct sunlight.

So – what is it about daylight anyway? Why all the fuss?

The psychological effects of daylight on the human psyche have been studied remorselessly. We know how vital sunlight is. Light affects how we feel. However, we still can't give a numerical value to light's effect on us. What I have discovered through my experiences with real people living in real light-and-dark spaces is that brightness and darkness each inspire their own set of emotions. Feelings rule! Since the beginning of this study I have observed that when people describe their homes, their love of light is always mentioned. They say things like: "In the morning, I love to eat breakfast in the kitchen because I like watching the patterns of light and shadow coming in through the skylight and the windows" or "I enjoy the feeling of coming home to a bright parlor – I don't like walking into a dark space in the middle of the day."

But does access to light affect our health?

The absence of natural light in row houses certainly became a health issue in post-industrialized Europe and the US, especially for the poor and working class who lived, for the most part, in this kind of housing. Wouldn't you think, however, that nowadays the question of natural light (and health) in our homes would not apply? Wouldn't you think builders and developers would be more sophisticated about this issue? Wouldn't you think they would recognize, above all else, the market value of providing plenty of natural light in their condos and townhouses? Unfortunately, for the most part, the issue of providing natural light is not considered a priority.

As we know, affordability (along with location) is the most significant factor in real estate. T'was ever thus. Price is a huge determining factor as to how homes are sold. For example, yesterday's grand row houses (built for upper-class merchants)

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having become unaffordable to today's generation are now being carved up into smaller spaces, made into apartments and "flats." You can easily see how chopping up a row house – unless very carefully managed -- will negatively affect access to light and ventilation.

We know now that access to natural light and direct sunlight influences how most people choose a place to live. This is certainly true for my friends, the Crutcher/Roller family. My friendship with this couple has lasted more than ten years so I was there to observe how they made their decision to leave that first ground floor flat in the Mission and move to a single-family row house in Bernal Heights. The very first thing they told me about their new house was that it had direct sunlight throughout the day.

The Row House today

Clearly the advantages of the Row House are clearly proved by history and experience. You can look at the Row House as a kind of dwelling that offers tremendous advantages to urban sprawl, to energy conservation -- and even to neighborliness – they do, indeed, facilitate hellos.

Regarding economics, here's a pertinent comment by Moudon: "Today change means conservation: we need to learn to be more careful with our resources. When the average cost of a house today represents approximately five years of an average family's earnings..." (Moudon, p.xv.)

WHAT CAN WE DESIGNERS CONTRIBUTE?

At the beginning stages of any housing design project interior designers and architects have a tremendous influence on how crucial daylighting issues are addressed.

Here are some key points to consider:

- Site orientation
- Access to natural light
- Electric lighting
- Light penetration
- Aesthetic values (of light on interior spaces)
- Ventilation
- Insulation

These elements can be achieved by employing some of the design elements, which we've discussed here today: light tubes, roof monitors, rotating louvers, or deep fenestration (as in the case of Corbusier's "Unite de Habitation" where his bris de sole panels have been beautifully employed to maximize natural light).



IN CONCLUSION

We've seen how the row house has endured as a building form for hundreds of years. It's still here. It has proven to be a viable dwelling for people to live in. Its flexibility and dramatic use of daylight renders it timeless.

The row house will be with us for many years to come.

The End!



Partial Bibliography

1. Brown.G.Z., Cartwright, B. "Sun Wind and Light", Wiley Press, New York, 1985
2. Brown.G.Z., "Inside Out: Design Procedures for Passive Environmental Technologies", New York, 1982
3. Byrne, Andrew, "London's Georgian Houses". The Georgian Press, London, 1986
4. Davis, Howard, "The Future of Ancient Lights", The Journal of Architectural and Planning Research, summer 1989, p.143
5. Davis, Sam "The Form of Housing", Van Nostrand Reinhold, New York, 1977.
6. Grinberg, Donald, "Housing in the Netherlands, 1900-1940", Netherlands: Delft University Press. 1982
7. Lockwood, Charles, "Bricks and Brownstone", The New York Row House, 1783-1929, New York, Abbeville Press, 1972
8. Moudon, Anne Vernez, "Built For Change, Neighborhood Architecture in San Francisco". The MIT press Cambridge, MA 1986
9. Methesius, Stefan, "The English Terraced House", Yale University Press, New Haven, 1982.
10. Plunz, Richard, "A History of Housing in New York City", Columbia University Press, New York 1990.
11. Reynolds, John, "Mechanical and Electrical Equipment for Buildings", New York; Wiley Press, 1990
12. The Royal Academy of Art, "John Soane Architect, Master of Space and Light", edited by Martha Richardson, Royal Academy Press, London, 1999

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