*Nina Rappaport*

# Preserving the Modernist Vertical Urban Factory

*Key words: factory, modern architecture, urban, vertical, modern movement, multi store building, industry.*

*This essay is adapted in part, from the section, "Modern Factory Architecture" case studies from Nina Rappaport's book Vertical Urban Factory, published by Actar this spring. Vertical Urban Factory began as an architecture studio, and then an exhibition, which opened in New York in 2011 and traveled to Detroit and Toronto in 2012. Last year the show was displayed at Archizoom at EPFL in Lausanne; Industry City, Brooklyn; and the Charles Moore School of Architecture at Kean University, in New Jersey. The project continues as a think tank evaluating factory futures and urban industrial potential.*

Philosophers including Vilém Flusser, Hannah Arendt, and Henri Bergson recognize the that the concept of *homo faber* -man who makes- is essential to human existence. Flusser described humankind as *homo faber* -man who makes- rather than *homo sapiens* -man who knows- because as "true" men and women we form societies and make things in production centers called factories. Flusser argues that, whereas the privileged classes produce art, we actually learn more by investigating workshops and guilds because that is where everyday people work. He suggests if we want to understand the past and present, or to anticipate the future, we need to ask questions about where and how things are, or were made. Thus the project Vertical Urban Factory aims to do just that.

While simultaneously awesome and nostalgic the factory has been marginalized in our culture. Focusing here on the preservation of significant Modernist factories, the mechanisms for their future, falls into three main categories, just as with so many other building types: the preservation in continuous use of a factory such as Usine Claude et Duval in France; the renovation of large factories for smaller factory uses in New York; the reuse of factories as lofts and other uses such as the Van Nelle Factory in Rotterdam; and then there is the determination that a factory and its building is obsolete, as with the recently demolished Sainsbury's factory in London.

The typology of the Vertical Urban Factory I define as a multistoried factory in the city, it does not have to be tall but uses the height as part of the processing either as "integrated" factories, which house one company, or as "layered" factories in which there are numerous factories in a multi-tenanted building. The manufacturing process can flow from top to bottom, or bottom to top. Pre-electrification mechanisms such as chutes, balconies, and pulleys served to move goods, and later elevators and moving conveyors increased the efficacy of production flow.

The factory was the epitome of Modernism capturing the imagination of architects such as Walter Gropius, Erich Mendelsohn, and Le Corbusier. Both the new technologies of mass production within the factory, and the experimental capacity of new materials of steel, glass, and reinforced concrete allowed them to design avant-guard structures.

**Usine Claude et Duval**

One inspirational Modern factory that is still in continuous use as a high-end garment factory is Corbusier's Usine Claude et Duval. Rebuilt after the destruction of the original factory in World War II, the five-story undergarment factory in St. Dié-des-Vosges is today filled with light and activity. Le Corbusier emphasized the significance of industrial architecture -the vernacular, primary forms of American factories designed by engineers- in his polemical writings of the 1920s including *Vers une Architecture* and *L'Esprit Nouveau*. He also had direct experience with factories organization. In 1917, he established the brick factory, La Briqueterie d'Alfortville, with friend Max Dubois for the Société des Etudes Industrielles et Techniques just outside of Paris. In this project, Le Corbusier was fascinated with ideas of Taylorism, best management practices, and ways to develop new products.[1] Even though the brick factory went bankrupt in 1921, the experience influenced him considerably; through it he learned principles of management, industry, finance, and commerce, and formed many important

*Nina Rappaport is architectural critic, curator an educator. Publications director of the Yale School of Architecture. Director of the project Vertical Urban Factory.*

*Duval factory. Exterior and terrace.*

business contacts.[2] He also designed a project a Green Factory, which he imagined as integrated with the landscape for a postwar project. All of these concepts coalesced into the design for Usine Claude & Duval, a project that furthered many of Corbusier's architectonic ideas while incorporating his knowledge of the functioning factory.

Following the destruction of the eastern French city of Saint-Dié-des-Vosges during World War II, industrialist Jean-Jacques Duval commissioned Le Corbusier to design a master plan for the town but didn't receive the commission. Nevertheless, Duval asked Le Corbusier to redesign his own factory destroyed in the war using funds allotted for postwar reconstruction. It allowed him to "not only build a factory better organized than the old one, but renovate with the advantage of impeccable order of engineers, also with simple decoration (clear colors, music at work. . .that were elements of comfort) and that would be sensible through to the details",[3] as noted by Paul Duval, the son of the owner.

With the Usine Claude & Duval, Le Corbusier employed his architectural devices of Modernist distinction including the "Modular", based on human measurements and the Golden Section, *pilotis*, the ribbon window, the roof garden, and the concrete *brise-soleil*. After three project design concepts, the Duvals with Le Corbusier, organized the factory production as a model. The raw materials and textiles would be delivered by electric lift to the third floor and then descend level by level, for each operation until the completed project was shipped out for distribution at the ground floor. The *pilotis* lifted up main volume so that the ground floor was open for storage of the workers' bicycles.

*Duval factory. Open ground floor and interior double height space.*

*Brooklyn Grange on Standard Motor.*

The new factory was situated in a compact site slipped between a series of older saw-tooth shed structures and the original factory stonewall at one end of the site, which Le Corbusier maintained as the end wall. He placed the offices on the top floor with an internal circular metal stair connecting to the manufacturing floor, where double-height spaces allow for ample light and air to enter the workspace. A grid of thin concrete *brise-soleil* shields the wood-frame windows from direct sunlight that animates the facade. The building's vibrancy is further enhanced with brightly painted elements signifying the various building circulation functions in deep red, yellow, blue, and green. The efficient circulation of goods and workers-with the building functioning literally as a machine that is continued today and completely intact condition with minor alterations for production and building efficiency.

**New York City Factories**

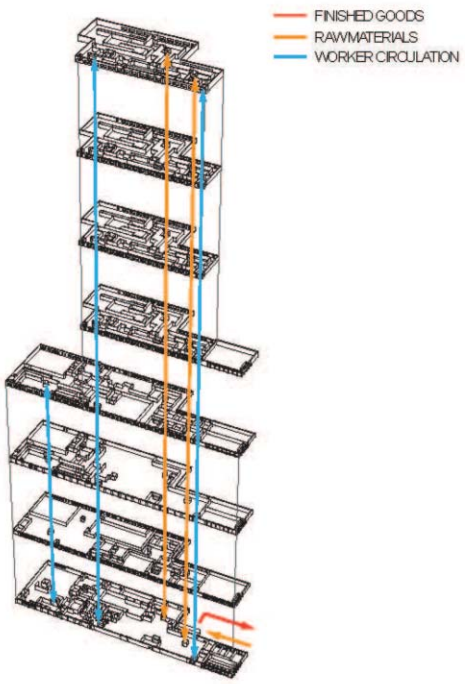
In New York City many factories are housed in what I call "flexible" factory buildings as multi-tenanted spaces. The buildings are usually former gigantic factory buildings and complexes, which are either publically owned (Brooklyn Army Terminal), in public private partnerships (Brooklyn Navy Yard), or privately owned (Industry City, Pfizer Building, Standard Motors). They mostly operate in a similar way, as real estate space for industry, but each has been working on upgrading the building infrastructure including, loading bays, adjacent roadways, pedestrian access, potential for retail in the ground floors.

In 2008, the New York-based Acumen Capital Partners began to branch out from more traditional development projects to assume the risks involved in owning, maintaining, and improving multi-tenanted industrial buildings to encourage new industrial uses. Their first project was the redevelopment of the Standard Motor Products building on Northern Boulevard in Long Island City. The eight-story concrete frame building occupies a site along the railroad and has access via a side street with immediate proximity to truck-loading bays.

*Standard Motors.*


Standard Motor Products is an automotive parts company that was founded in 1919 in New York, first focusing on ignition and electrical products. Their main market is replacement parts -including wire, cable, and ignitions- not goods for the initial production line. The company moved from Manhattan to Long Island City and leased a space there in 1923. As the company expanded, they needed their own facility, which they built on Northern Boulevard and completed in 1936. By 1994, Standard Motor Products was on the Fortune 500 list. With their company's reach now overseas, the New York facility became an office and showroom, rather than the head manufacturing plant. After Acumen Capital bought the building, Standard Motor continued to lease a portion of it. The rest of the building was renovated by Bromley Caldari Architects, who redesigned and opened up a lobby space and installed retail spaces in the first-floor loading docks, common bathrooms, and new elevators, as well as new industrial sash windows.

*Pfizer factory. Back side with ducts, exterior and functional diagram.*




*Pfizer factory. Welders in workshop.*

The building's concrete structure, with typical Turner mushroom columns, was built to hold many times more its weight. Due to this capacity, the Brooklyn Grange, an urban farm, requiring forty tons of soil for its plantings, was able to occupy the building's roof. The industrial spaces are leased at various sizes, from 929 to 2,000 square meters, to tenants as varied as a commercial printer, a metal embosser, an offset printer, an art printer, the Jim Henson Company, the Franklin Mint, and Broadview Networks. It was recently purchased by yet another real estate company who maintains the original vision for industrial space.

Another building, the former Pfizer plant on Flushing Avenue in Brooklyn, is Acuman's second multi-tenanted manufacturing space. Pfizer was founded in 1849, and built the eight-story brick and concrete grid behemoth of 575,000 square feet of space, with ten loading docks and ample parking in 1948. They left the building in 2009 and Acumen purchased it in 2011 with a vision for a new industrial community.

Formerly filled with thousands of workers making chemicals and compounds for drug production, Acumen realized that they could take advantage of the existing state-of-the-art labs and infrastructure built for liquid processing -stainless steel vats, drums, mixers, giant refrigerators, and chemical labs- to accommodate diverse manufacturing uses. The company's new tenants, who have occupied the space since 2012, are primarily artisanal food production companies -from makers of pickles and ice cream to kombucha and pasta- as well as wood workers, furniture makers, steel welders, and artists. All find the building's thick floors and large windows, with views to Manhattan, perfect for heavy industrial uses. The mix of uses and a community that is growing in place - these various enterprises employ fewer

*Van Nelle factory. Glazed façade.*

workers but pay above minimum wage. As one of the Acumen partners, Jeff Rosenblum, notes, the building's location and facilities make it easy for a young company to lease smaller spaces and then grow in an incubator environment. Acumen envisions more public ground-floor space used for cafés or farmer's markets. New additions to the space include educational programs such as Pratt Institute's Brooklyn Fashion and Design Accelerator.

**Van Nelle**

Another more typical use of former large-scale modern factories are those that are renovated for other uses, often creative offices, architects or other businesses. The Van Nelle factory is a well-known example of this adaptive reuse. A seminal project of the Nieuwe Bouwen group of Dutch Modern architects, the Van Nelle company -a tobacco, tea, and coffee production facility with glass facades, dramatic bridge overpasses for conveyors, and smooth surfaces- exemplified the Modern aesthetic in Rotterdam. The building was restored in 2008 by Wessel de Jonge and currently houses creative companies and mixed use commercial spaces. It was nominated to the UNESCO World Heritage list in 2014.

Kees van der Leeuw hired the architects Michiel Brinkman (1873-1925) and Leendert C. van der Vlugt (1894-1936) to design their factory along a canal, a short distance from the city's bustling harbor. The complex included a series of separate but connected buildings of varying heights for the processing and packaging of coffee (six stories), tea (three stories), and tobacco (eight stories). Additionally, there were warehouses, offices, and worker amenities such as a soccer field and a library.

The Van Nelle factory's emphasis on transparency created a new model for manufacturing spaces by exemplifying a hygienic, light-filled, airy environment, one open to both internal and external views. As a vertically organized factory, production flowed from the upper to the lower floors, with the raw goods delivered to the topmost floor as organized by the production engineers.


*Van Nelle factory. Initial state without inclined glass bridges.*

Transport shafts and conveyors were aligned adjacent to the staircase volumes. The final products were transferred into the glazed dispatch buildings via overhead U-shaped platform conveyors circulating from the interior of the factory to the enclosed glass bridges traversing the site's internal street.

Innovative structural engineering allowed for new manufacturing configurations. The eight floors of the tobacco factory were designed to be flexible for machinery to be moved as needed, by means of a structural system that engineer Jan G.Wiebenga developed. The building for tea processing was only three stories high so that workers could transfer tea leaves quickly through the bridges to the dispatch buildings, thereby maintaining the leaves' consistency. In a fluid movement system, the tea was placed on an elevator to the second floor and the empty boxes were fed down and out of the building through exterior slides. On the second floor the leaves were separated, cleaned, and blended, then poured down through openings in the floor to the first floor for tasting. The ground floor, as in the other buildings, contained the packaging and labeling.

The verticality of the six-story coffee factory was used to the fullest, including a two-story volume to house the roasting machines and stainless steel storage silos. This section was built between 1928 and 1930, with the ceiling heights from 3.5 meters to seven meters high to allow for the machinery, and factory floors 18.9 meters deep. North-facing roof monitor skylights illuminated the space where the coffee beans were sorted and then ground on the second floor and transferred to the main floor for packaging.

*Sainsbury factory in construction.*

Although the use has changed, the building retains its industrial aura, as an exemplary modern factory.

**Sainsbury's**

Sainsbury's, the first supermarket chain in Great Britain, commissioned Sir Owen Williams (1890–1969) the renown British engineer, to design their new London factory in 1932. Williams had designed the more reknown Boots factory in Nottinghamshire of 1931, but Sainsbury's was the first flat-slab concrete construction in London and the first structure in England built of poured-in-place concrete and was touted as a feat of construction.[4] While it was proposed for heritage status in 2009, it was denied, one can only think because of development pressures in the area, since the exterior of the building was intact and the building has just been demolished for a new high-rise tower.

Food-related commerce moved from the home to large production facilities in the early days of mass production to be close to their consumers. Sainsbury's, founded in 1863, was for decades the largest grocery retailer in Great Britain. The company was best known for their own brand of cooked meats, sausages, pies, and prepared meals (which they invented).

Williams saw concrete as a universal material representing the future that provided factories with obstruction-free spaces in the form of a "shell surrounding a process." In the heart of the industrial city, he designed a six-story, 46,000-square-meter building on an irregularly shaped site along Rennie Street in Blackfriars. By using 25-centimeter-thick, flat-slab concrete floors supported on pyramidal mushroom columns that had a folded Cubist quality (1.5 meters in diameter for the basement and decreasing in diameter on the upper floors), Williams was able to design the structure with a regular, 13-by-11-meter grid and 4.5-meter floor-to-floor heights. Steel casement windows with translucent upper panes filled the structural framework with diffused light. The central section of the roof contained glass round lights set in concrete, as a skylight, and the interior had partitions in metal and glass. The factory was built in two phases: the main building and an annex. Seemingly, form followed function in every detail, including the hygienic, easy-to-clean tile floors.

*Sainsbury factory. Boning hall.*

Production was organized vertically. The basement held the curing cellar, storage, pigs' heads and brisket boning, the boiler room, and a paternoster elevator that ran on pulleys in a circular motion. The ground-floor loading bay spanned the full 26-meter width of the building. There, pig carcasses and raw goods were unloaded and moved to the upper floors by lifts, and final goods were sent down for packaging via lifts and gravity chutes. The fourth floor housed the meat kitchen, and the third floor was the Holy of Holies. It featured a seasoning room for storing garden-grown fresh herbs, as well as ovens and grinding machines.

The second floor, with its mechanized overhead conveyance system, contained the butchering and sausage-making areas with chopping machines down the center of the floor; the meat parts went onto racks and were packed into flats and cut into sections for pies and sausages. The first floor housed the packaging, offices, and cooling areas for sausages and steak and kidney pies. The annex housed the dough and flour storage. Completing the processing loop, the ground floor received the return of parts, including the fat and bones that went to the first-floor annex and tanks for the fat to settle. The annex also contained smokehouses and tanks for sausage cooking. The processing used the full verticality of the building, beginning at the bottom and looping down to the first floor again for waste. For safekeeping of company secrets, the recipes were locked up each night, then given out to the workers each morning.

Sainsbury's occupied the factory until 2002 and it was sold to a developer for a high-rise project in 2015. Unfortunately its untimely demise is an indication of the continuous need to educate people as to the importance of industrial architecture.

As the need for smaller, cleaner, and greener manufacturing is gaining traction, and the interest in self-sufficiency becomes an economic goal within the global network, there is increase need for more manufacturing spaces in cities and the vertical factory in these robust modernist buildings are a perfectly suitable structures to reimagine the future of urban production spaces.

## Notas

1. Mary McLeod, "Architecture of Revolution: Taylorism, Technocracy, and Social Change," Art Journal 43 no. 2 (1983).
2. Ibid.
3. Jean Jacques Duval, Le Corbusier, L'écorce et la Fleur (Paris: Ed. du Linteau, 2006), 112.
4. "New Warehouse at Blackfriars for Messrs J. Sainsbury Ltd.," Architect & Building News, January 11, 1936, 61–64.