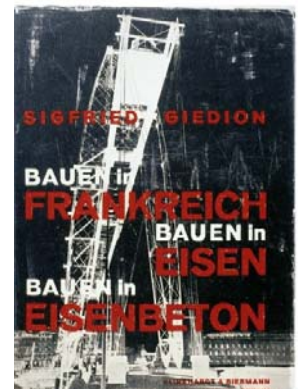


## FRENCH RATIONALISM & ENGINEERING

Tradition of French Classical Rationalism: Perrault, Laugier, Viollet-le-Duc, Ecole de Beaux-Arts, Choisy, Guadet, Perret, Garnier, Le Corbusier...

- \* S. Giedion, Building in France, Building in Iron, Building in Ferroconcrete (1928)

Role of history in envisioning future  
Role of construction and industry in determining future  
19thC Iron leads to 20thC Ferroconcrete



- \* F. Hennebique, *ciment armé*, c.1897  
E. Ransome, Machine Shop, Greensburgh, PA, 1901

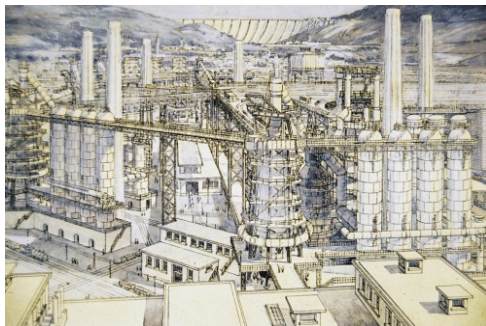
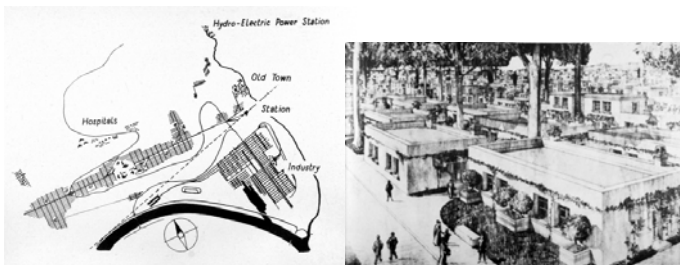
St. Jean de Montmartre Church, A. Baudot, Paris,  
1894-1905 (*beton armé*)

Auguste PERRET (1874-1954)

- \* Rue Franklin 25bis, A. Perret, Paris, France, 1902-3  
Champs Elysees Theater, Paris,  
Rue Ponthieu Garage, A. Perret, Paris, 1905
- \* Church of Notre Dame, A. Perret, Le Raincy, France, 1922-3  
Rue Raynouard Apts., A Perret, Paris, 1929-32

Tony GARNIER (1869-1948)

- \* Cité Industrielle by T. Garnier, published 1917 (begin 1901 in Rome)  
Abattoir (Slaughterhouse) La Mouche, T. Garnier, Lyon, 1909-16  
Hôpital Grand Blanche (=Hosp. E. Herriot), Lyon, France, 1918-30



1854	William B. Wilkinson, an English plasterer, erected a small reinforced concrete two-story servant's cottage. He reinforced the concrete floor and roof with iron bars and wire rope. This is credited as the first reinforced concrete building.		1891	George Bantlowm placed the first concrete street in the United States in Bellefontaine, Ohio, which still exists.	
1859 - 1867	Portland cement is used in the construction of the London sewer system.		1892	Francois Hennebique patented a reinforced concrete building system used in the home at right. Note the two intersecting cantilevers carry weight of 200 ton tower. Hennebique was responsible for the widespread acceptance of reinforced concrete.	
1866	Lehigh County resident David O. Saylor led three partners to found the Copley Cement Company to produce natural hydraulic cement. <a href="http://www.vocenet.com/~chs/museum/cementinfo.html">http://www.vocenet.com/~chs/museum/cementinfo.html</a>		1899	Robert Maillart builds Stauffacher Bridge in Zurich.	
1867	Joseph Monier, a French gardener, patented a design for reinforced garden tubs. He later patented a design for reinforced concrete posts and beams for railway and road guardrails.		1897	Sears Roebuck offered a barrel of "Cement, natural" at \$1.25 per barrel, they also listed "Portland cement, imported" at \$3.40 per 50 gallon barrel.	
1868	The first recorded shipment of portland cement to the US.		1901	Arthur Henry Symons designed a column clamp to be used with job-built concrete forms.	
1850 - 1880	Francois Coignet, a French builder, is responsible for the first widespread use of concrete in construction.		1902	Thomas Edison was a pioneer in the further development of the rotary kiln.	
1871	David O. Saylor established the first portland-cement plant in the United States in Copley, Pennsylvania.		1902	August Perret designed and built the 25 Rue Franklin apartment building in Paris that used what he called "The Trabeated System of Reinforced Concrete." This system was studied and used often influencing architecture and concrete construction for decades.	
1871 - 1875	William E. Ransom builds the first landmark building in reinforced concrete in Port Chester, New York, designed by Architect Robert Moock.		1903	August Perret builds the Theatre Champs Elysee in Paris.	
1884	Earnest L. Ransom patented a reinforcing system using twisted square rods to help the development of bond between concrete and reinforcing.		1904	The Ingalls building was the first concrete skyscraper. Constructed in Cincinnati, Ohio in 1904, it made use of the Ransome system of reinforcement.	
1885	F. Ransome patented a slightly tilted horizontal kin which could be rotated so the material moved gradually from one end to the other.		1904	In 1904, precast concrete was used in two projects in Sydney Harbor, Bradley's Head Lighthouse and Millers Point Wharves. A Brief History of Precast Concrete can be found at: <a href="http://www.lbe.unsw.edu.au/subjects/arch/5203/95-1/95en/as/signs/History.htm">http://www.lbe.unsw.edu.au/subjects/arch/5203/95-1/95en/as/signs/History.htm</a>	
1887	Henri Le Chateleur of France established oxide ratios to prepare the proper amount of lime to produce portland cement. He named the component: Alite (tricalcium silicate), Belite (dicalcium silicate), and Celite (tetra-calcium aluminoferrite). He proposed that hardening is caused by the formation of crystalline products of the reaction between cement and water.		1905	Frank Lloyd Wright begins construction on the famous Unity Temple in Oak Park, Illinois. Taking 3 years to complete, Wright designed the massive structure with 4 identical sides so that its expensive formwork could be used multiple times.	
1889	Gyozo Mihalich designed the first reinforced concrete arch bridge. The bridge consisting of two spans of 5 m each, was built in the village of Solt, Hungary.		1905	As the concrete industry begins its boom a group at the concrete convention in Indianapolis sees a need for a group to oversee the industry. The National Association of Cement Users is formed.	
1880	The addition of gypsum when grinding clinker to act as a retardant to the setting of concrete was introduced in the United States. Gypsum calcium sulfate dihydrate, retards the curing process before the cement is packaged and shipped. Only a small amount is needed.		1917	Mies van der Rohe proposes concrete high-rises.	
1884	Which will later be renamed the American Concrete Institute. The groups' objective is to promote knowledge of the art of cement, while promoting efficiency through teaching and research. <a href="http://www.concrete.com">http://www.concrete.com</a>		1907	J. H. Chubb of the Universal Portland Cement Company introduced the exposed aggregate method of concrete surfacing. He washed the concrete before it set with dilute acid. This was an innovative step in aesthetic uses for concrete.	
1888	Thomas Alva Edison patents a system of cast-iron molds for a monolithic concrete house that forms walls, floors, stairways, roof, bath and laundry tubs, and conduits for electric and water service in one single casing operation.		1908	A Norwegian civil engineer named Fougner thought of using concrete to build ships. It wasn't until 1917, when wartime steel shortages required the use of cement for construction that Fougner's idea was used. In 1918, a Concrete Ship, the Atlantis was commissioned.	
1891	With the invention of "Shotcrete" came the ability to place concrete in vertical or horizontal surfaces without formwork. This process has paved the way for easier placement procedures and for an alternative repair method.		1911	The first patent for a concrete pump was filed. This made concrete transportation easy and allowed on site mixing.	
1893	The Panama Canal is opened after decades of Construction. It features 3 pairs of concrete locks with floors as thick as 20 feet and walls as thick as 60 feet at the bottom.		1913	Portland Cement Association founded in 1916.	
1896	Eugene Freyssinet builds <a href="#">Airstrip Hangers at Orléans</a> .		1916	The US Bureau of Standards and the American Society for Testing Materials established a standard formula for portland cement.	
1904	A 230 foot Medical Arts building, built in Dallas, Texas is the tallest concrete building to date.		1922		