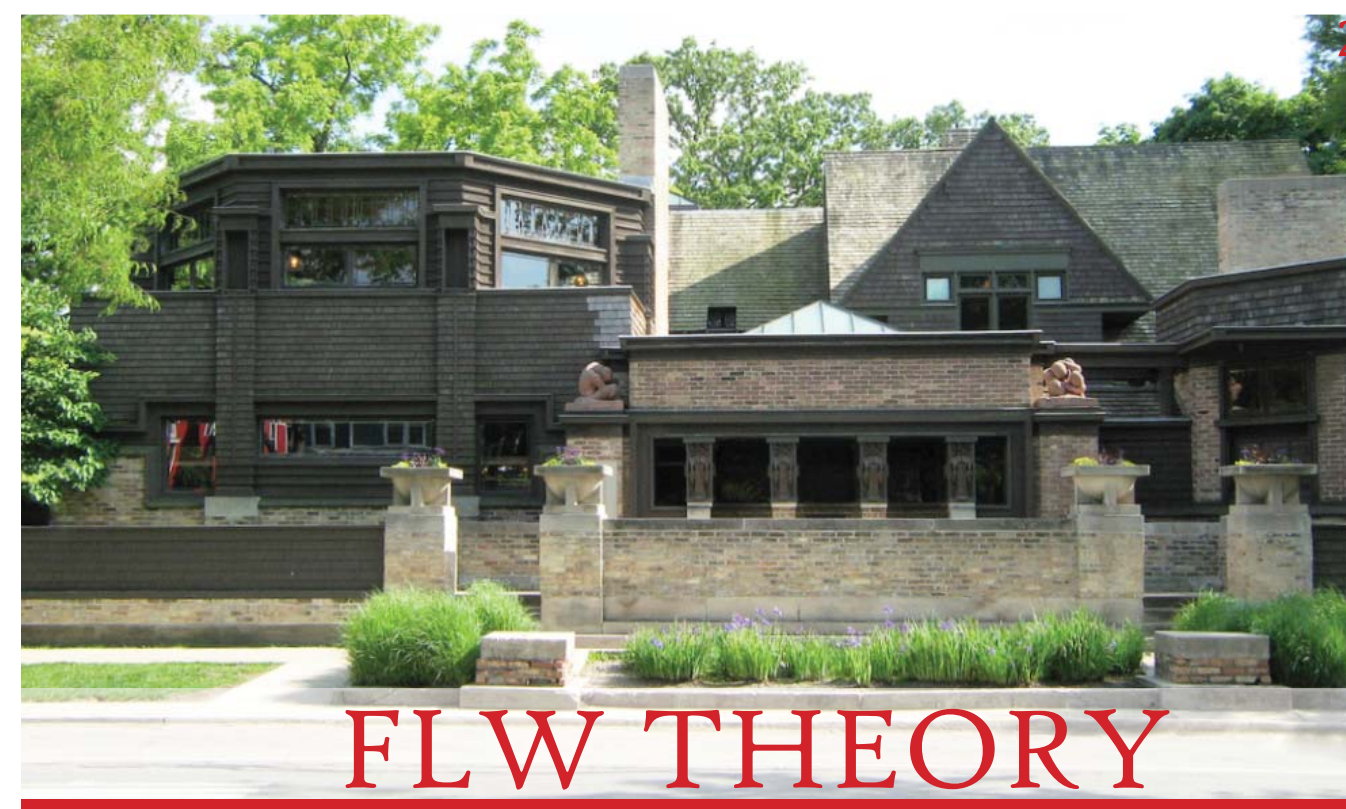




SUSTAINABILITY

One of the most forward thinking architects of his time was Frank Lloyd Wright. In the beginning of his career, Wright used ideas that we now refer to as passive design to ensure his building worked well with nature to provide proper comfort for the occupants. Frank Lloyd Wright would create one-of-a-kind designs driven by the site. Three buildings that show this relationship well are Fallingwater, the Walker Residence, and the Jacobs House. This presentation will focus on the three specific buildings and their unique primary passive systems.

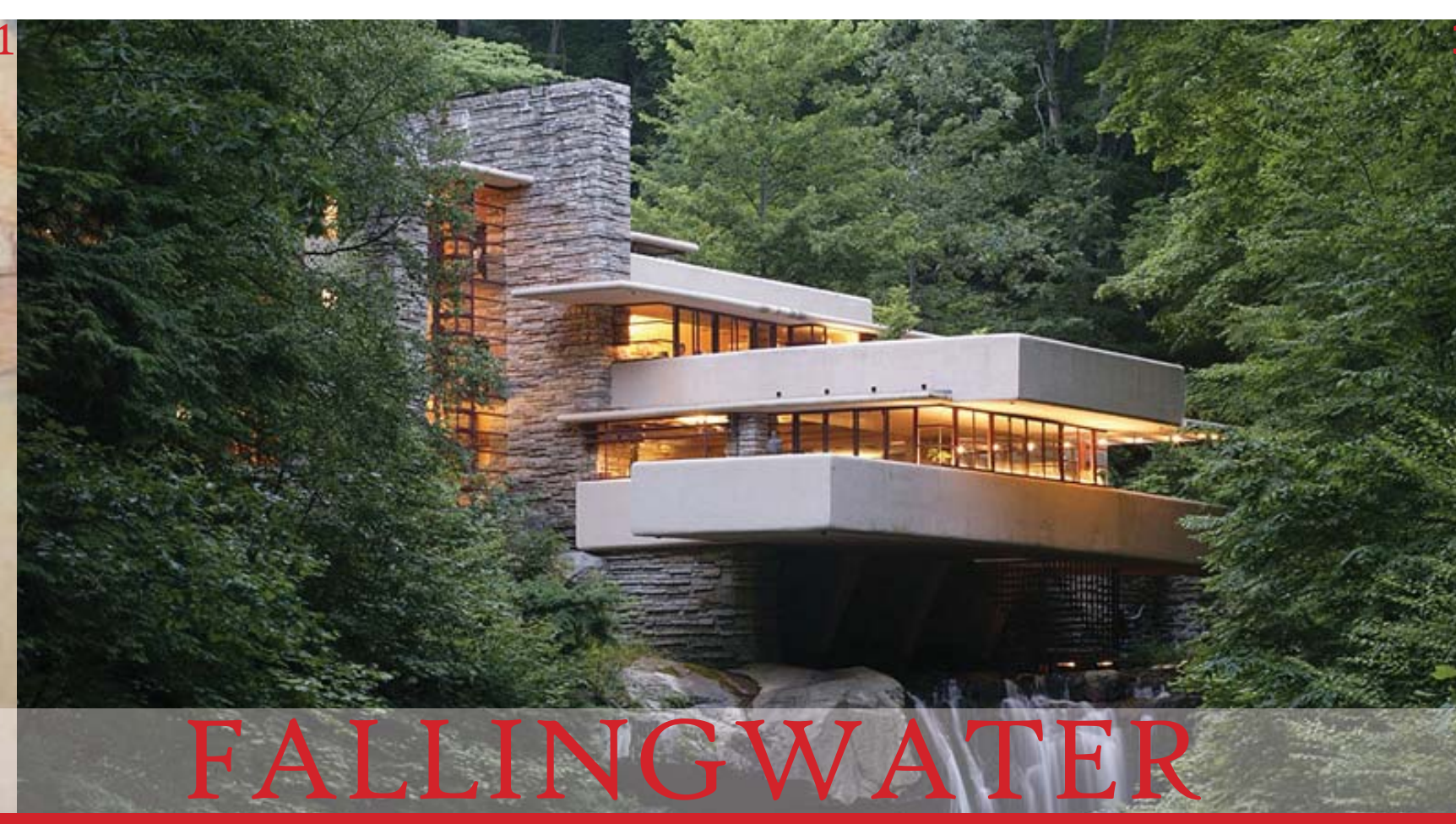


FLW THEORY

Frank Lloyd Wright designed houses to provide maximum comfort for the occupants. He focused on providing a house that felt as natural as the site around it. He created ventilation with the use of casement windows and porches. He framed views of nature by carefully placing windows, using corner windows in several cases. Wright used roof overhangs and other shading devices in order to block direct sunlight from entering the large amount of glazing on the buildings. Frank Lloyd Wright always designed his buildings to enhance the way the occupants experienced the surrounding nature.

PRESENT

Architectural sustainability has permeated every part of the field from building orientation, to landscaping choices, to finish materials. Sustainability has become an important part of architectural design in the last few decades, but is commonly based off of other architect's practices. Frank Lloyd Wright's use of overhangs is a popular practice today. There are commonly individual shading devices placed over windows on a building, especially on the south façade. Wright also incorporated natural ventilation into every building he designed, which has since been proven to be very important to the occupant's health.



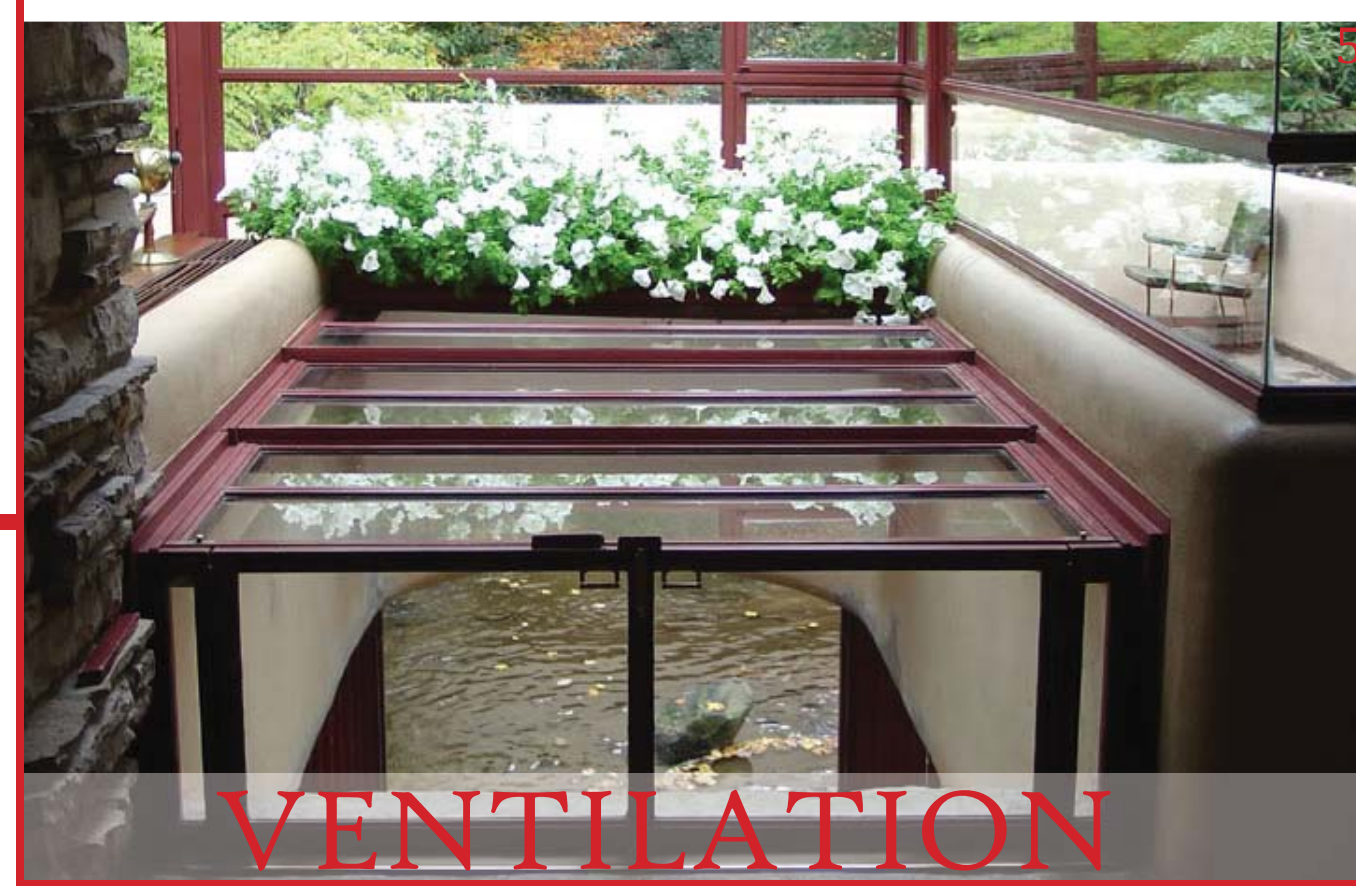
FALLINGWATER

Fallingwater is a vacation house designed for the Kaufmann family and completed in the spring of 1937. It is located in Bear Run, Pennsylvania over a stream and waterfall. When Wright visited the site, he saw and heard the waterfall and realized its potential to create a comfortable living space for the occupants. He accomplished his task with many design elements including large cantilevers and specific ventilation techniques.



CANTILEVERS

One of the most noticeable traits of Fallingwater are the large cantilevers. They are made of concrete and are used to simultaneously block direct sunlight while creating indirect sunlight. Direct sunlight creates a lot of solar heat gain while indirect sunlight provides ample light with minimal heat gain. The cantilevers over the porches provide comfortable shaded outdoor areas which blur the line between the indoor and outdoor areas.



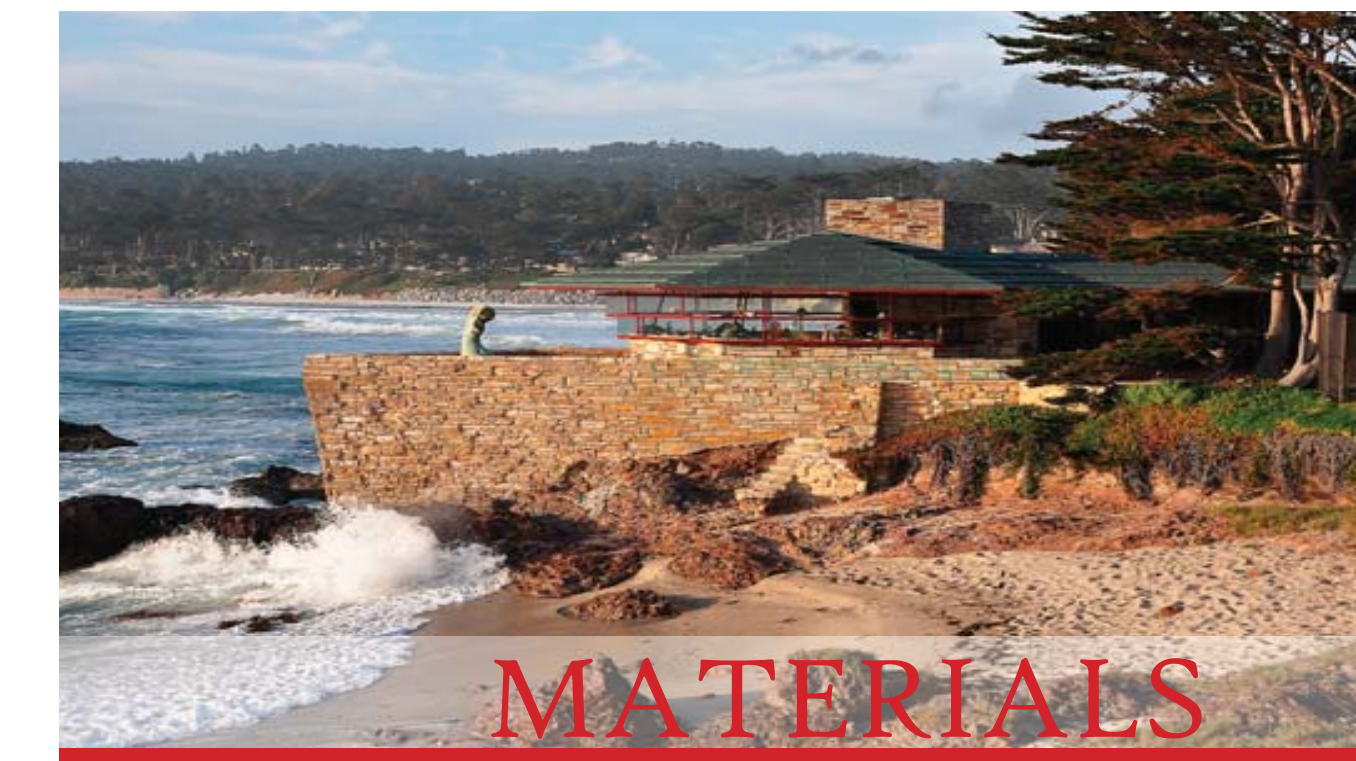
VENTILATION

When Frank Lloyd Wright saw the waterfall and stream on the site owned by the Kaufmanns, he knew there was potential to use the water feature as passive cooling. In the living room, there is a glass door which opens onto stairs that lead to a porch near the waterfall. The door is similar to the door on a boat leading from a deck to a below deck cabin and can be left open to take advantage of the evaporative cooling created by the stream. Evaporative cooling is caused by warm air interacting with a body of water which cools the air and creates gusts saturated with water particles. This cooler air then flows up through the house and pushes the warmer air out of the building.



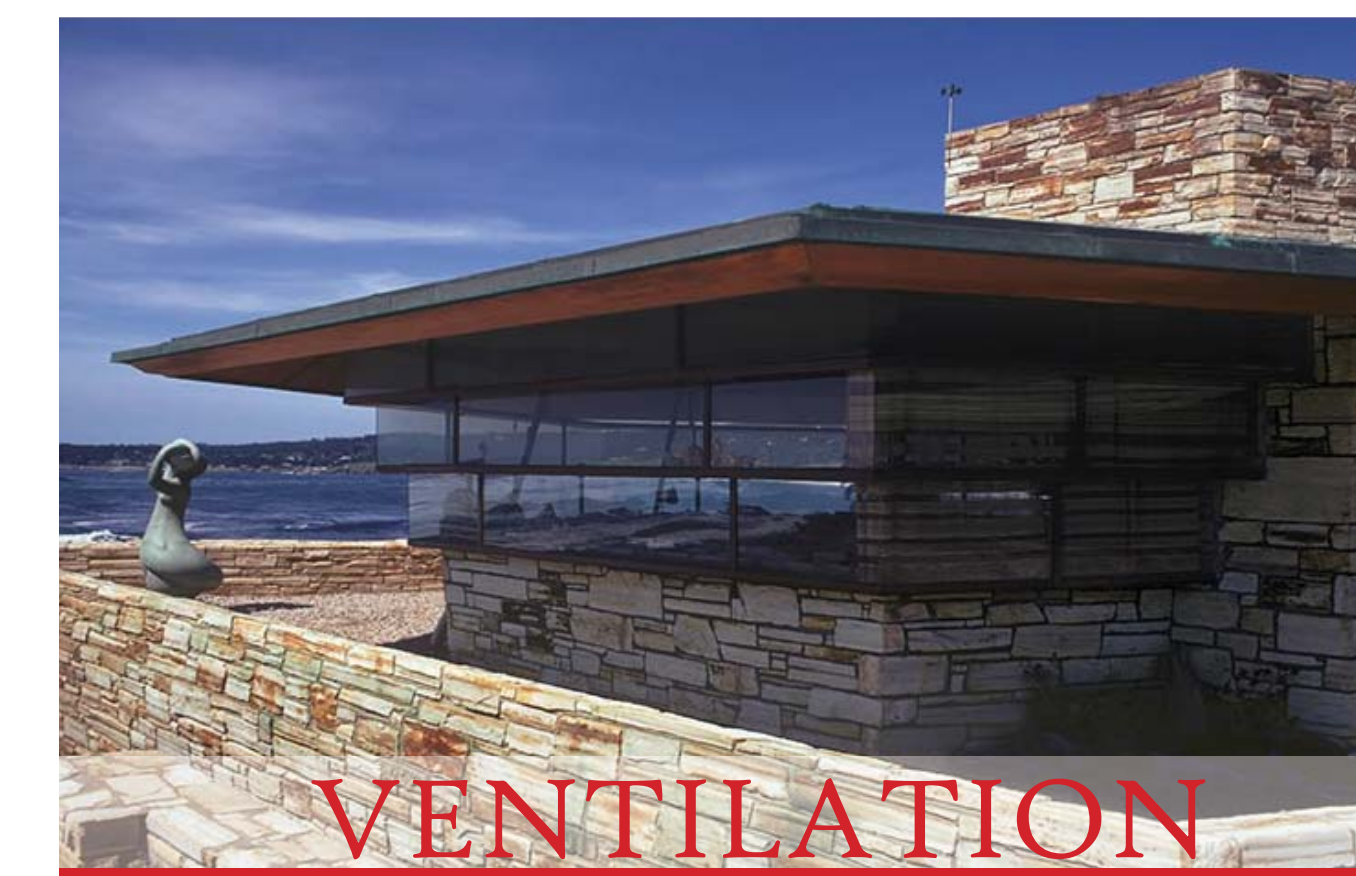
WALKER RESIDENCE

The Walker Residence was designed for Mrs. Clinton Walker in Carmel, California. It was built in 1951 overlooking the Pacific Ocean. Frank Lloyd Wright knew the site was one-of-a-kind and made sure to design the house in a way that would embrace the features of the site such as great views, typical California weather, natural stone, and sea breeze.



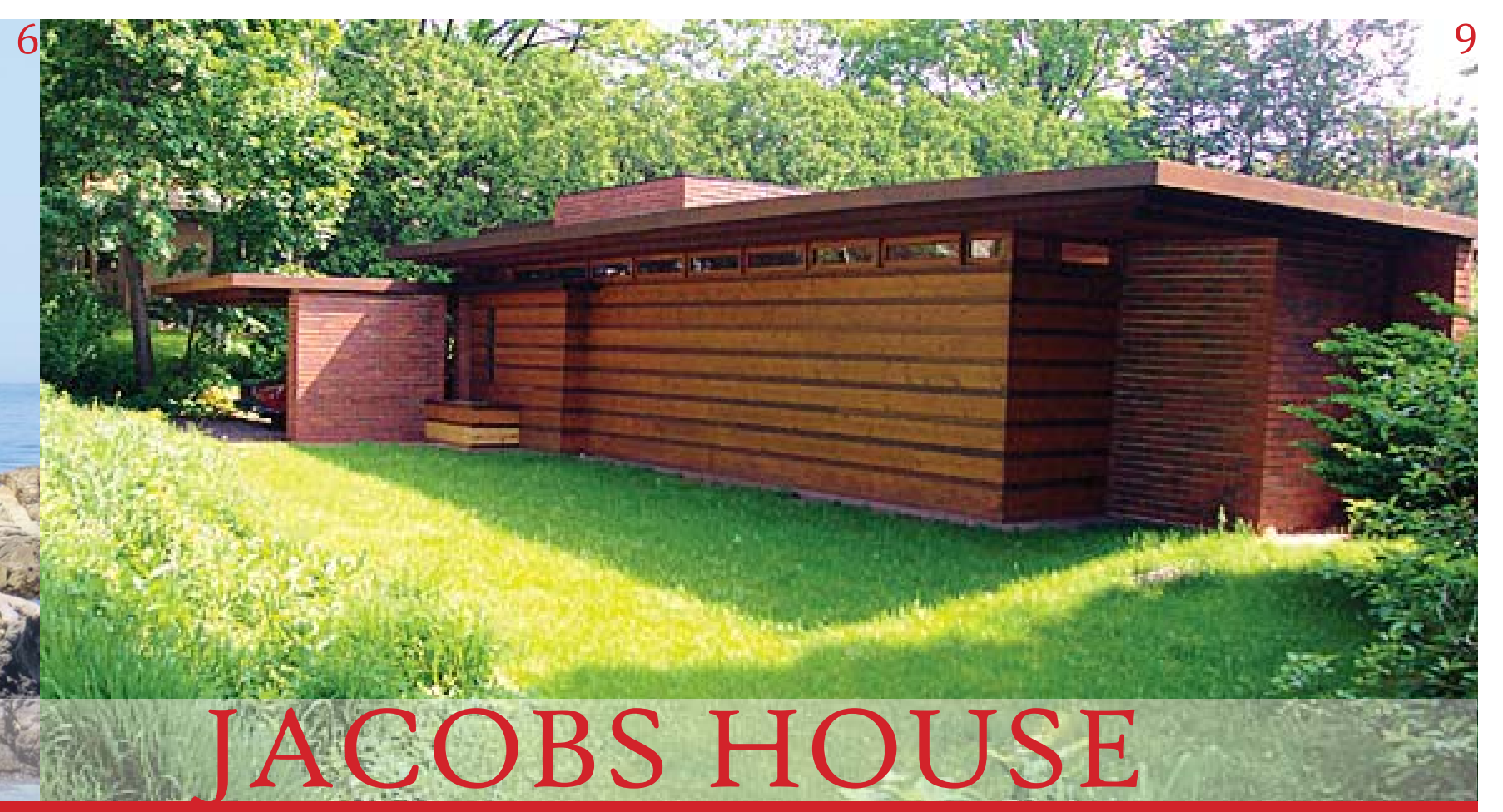
MATERIALS

The material choices for the Walker Residence were a very important part of the designing the building to fit into the site. The house rises out of the sand on a stone foundation. The profile line of the porch suggests the feeling of a cliff to the viewer. Behind the porch, the three walls of glazing creates the illusion of the house receding from the beach. The low sloping, copper roof with deep overhangs grounds the building.



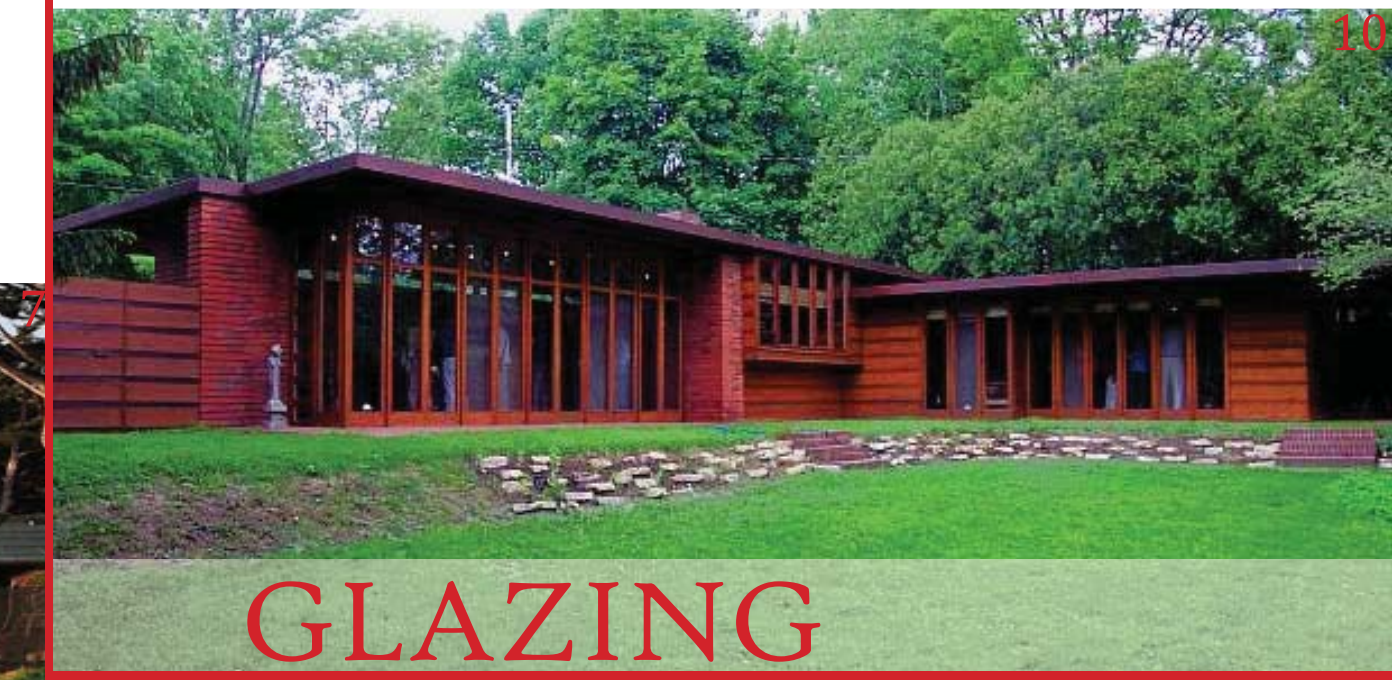
VENTILATION

Frank Lloyd Wright created a 180 degree view of the Pacific Ocean with his design of three wall of windows on the west section of the building. The glazing is stepped back and thin strips of screen were added horizontally in between the panes of glass. This innovative design of the window blocked the harsher gusts of air off the sea while still allowing a gentle flow of air through the horizontal screen. The roof overhang on the west section of the building are also deeper to ward off direct sunlight and additional wind.



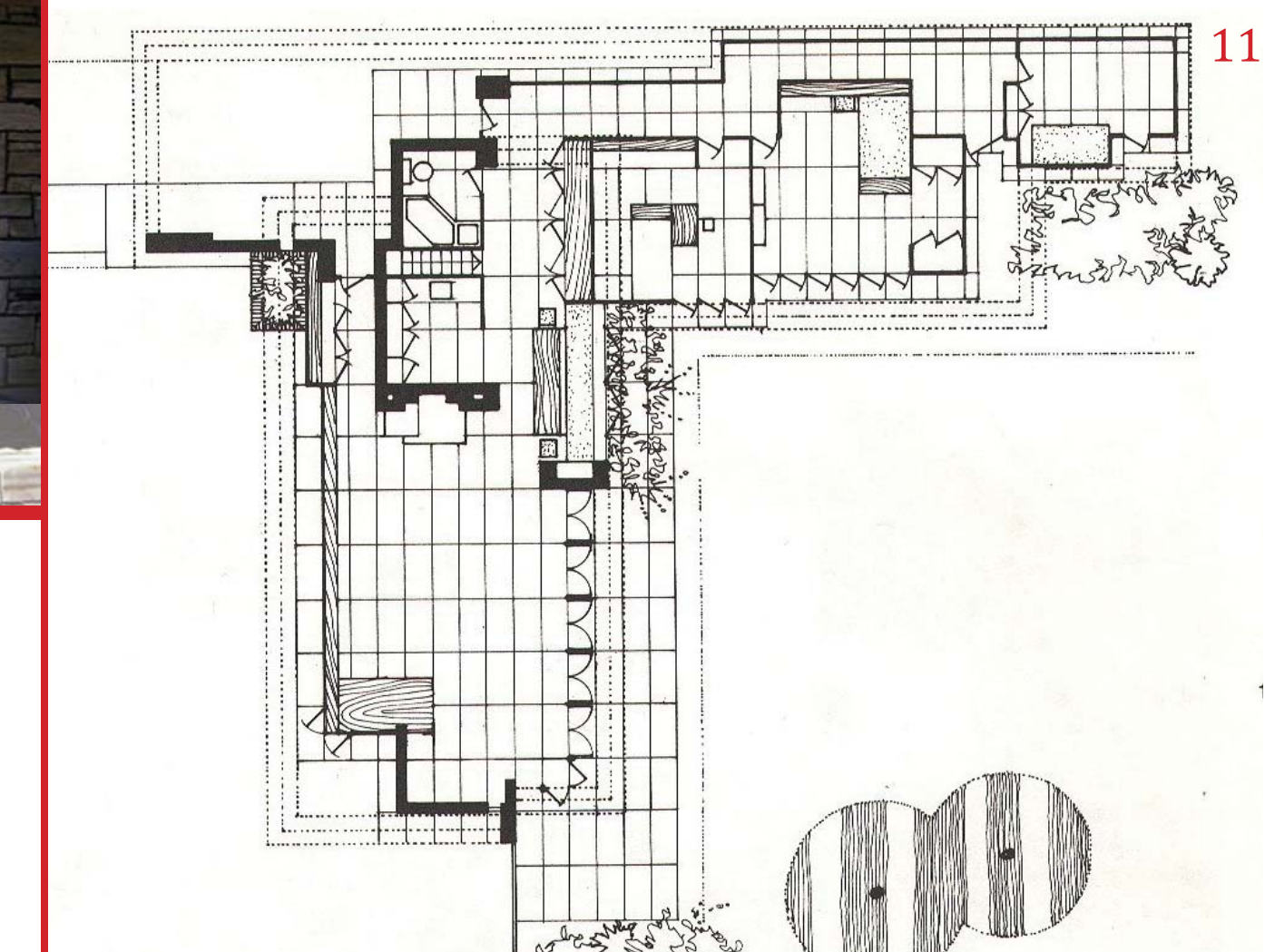
JACOBS HOUSE

The Jacobs House was designed by Frank Lloyd Wright in 1936 for the Jacobs family and is classified as one of his Usonian designs. It is located on a gradually sloped, wooded site in Madison, Wisconsin.



GLAZING

In Wright's Usonian house designs, privacy was a prominent design concept. The front door of the Jacobs House is tucked under the carport instead of placed on the front façade. The windows on the street side of the house are placed above eye level yet span most of the wall. By designing windows in this fashion the homeowners do not have to worry about passersby looking in their windows. Frank Lloyd Wright contrasted the opaque front façade of the Jacobs House with a transparent back façade. He designed a wall of glass doors looking upon the porch and woods behind the house with floor-to-ceiling windows in the bedrooms and office. This contrast allows light and air to flow throughout the house.



OUTDOORS IN

The sounds and smells of nature can be experienced inside the house through the open doors in the living area and the open windows in the bedrooms and office. The wall of glass doors on the back side of the Jacobs house can be opened to welcome fresh air into the house. When these doors are opened, one can walk over the patio and onto the grass without any change in elevation. This experience dissolves the difference of inside and outside, which connects the house and occupants with the nature around them.

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Pictures

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