THE BUTTERFLY VIVARIUM, Milwaukee Public Museum, Milwaukee, Wisconsin, 2000

A modest addition to the huge 1959 Milwaukee Public Museum building, the Butterfly Vivarium is a steel and glass enclosure built to sustain Costa Rican rain-forest insects in a harsh continental climate, and allow museum visitors to interact directly with them. Entered from inside the existing museum, the addition took the simple form of a long, linear east-west shed, allowing the rain forest exhibit to be passively solar heated in fall, winter and spring, while overhangs and sunshades provide summer shading to prevent overheating. Completed in 2000 with its walls clad entirely in two separate layers of glass, the Vivarium was in all likelihood the first double-envelope built in America since the Hooker Chemical Building of the 1970's.

Urbanistically, the 1959 museum had been designed as a suburban building set within a zero-lot-line city, surrounded on all sides by substantial set-backs. Working with the museum since 1993, the Vivarium was one in a series of efforts to urbanize the complex by bringing additions out to the street edge, and articulating defined courtyards in the process. Sited right on the property line, the Vivarium provides rain cover for the sidewalk with its overhangs, and has a marble bench along its entire length allowing pedestrians to take a seat, or children to stand and peek into the Vivarium and view the butterflies from the street.
A new south-facing exterior courtyard was formed by the Vivarium (at left), and by cladding the blank existing exterior with a veneer of glass multi-purpose spaces. A grove of locust trees produces a shaded canopy for museum visitors to dine outside in the sunken courtyard.
A limestone-clad black box exhibition space was also designed to provide for light-sensitive lepidoptera collections and educational materials.

A live Costa Rican butterfly lands on the hand of a young girl visiting the Vivarium.

The 3' thick double envelope protects the Vivarium interior from sound, excess solar radiation and winter cold.
Technically a “Return-Air Double Envelope”, the design thickens the normally thin glass exterior wall to the point where it becomes a return air plenum, moving relatively dry air from a museum lobby across the façade and back to a mechanical room to buffer the Vivarium from winter cold and summer heat. With temperatures of 80°F and a relative humidity of 80%, the Vivarium air never comes into contact with the cold aluminum and glass of the outer most glass wall, preventing the water vapor from condensing on the glass and dehydrating the butterflies in cold weather. The outer layer of the double envelope is a 3-inch thick insulated unit containing motor operated aluminum louvers. These louvers are controlled by a seasonal program using solar cells which sense the presence of direct solar gain, and open or close the louvers appropriately. Inside of this insulating glass is a 3-foot wide service walkway, which allows for the cleaning of the glass and for the re-lamping of fixtures. On the interior of this service walkway is a single-pane light of ½” tempered glass, which separates the double envelope from the high humidity of the Vivarium. Located directly on a major street in downtown Milwaukee, the double envelope also quiets traffic noise in the same way that acoustical glass uses various layers and voids to interfere with sound transmission.