



Bright, open space. While the cupola admits light, a beam replaces bearing walls that divided the kitchen from the living room. The madrona-tree column connects the interior space with the outside. The darker 2x4s are the old rafters. Photo taken at A on floor plan.

Daylighting Strategies for a Ranch-Style Home

A kitchen cupola and bedroom/bath clerestories bring natural light into a suburban ranch

BY ANNI TILT

Alan and Catherine Palter's house looked like every other house on the block. With the exception of a nicely landscaped front patio, it featured all the faults of the typical 1950s ranch house: small dark rooms, poor circulation and utter disregard for orientation and connection to the site.

When the Palters approached my architectural firm and builder Ernie Columbello to discuss remodeling, they said that they wanted to make their house into a hidden treasure. From the street, the house would be almost unchanged (photo right), but inside, it would be open, airy and connected to the natural wilderness of a canyon behind the house. Everyone agreed that the design solution and the materials had to be both ecological and cost-effective while adding character to the building. The reality of the Bay Area's present, frenzied building climate, however, made cost control a major factor.

Daylighting is an elegant, cost-effective way to make spaces feel bigger and more vibrant. Rather than adding a lot of square footage, then, daylighting became the form-giver for the remodel, enhancing what was good about the house and improving what was not.

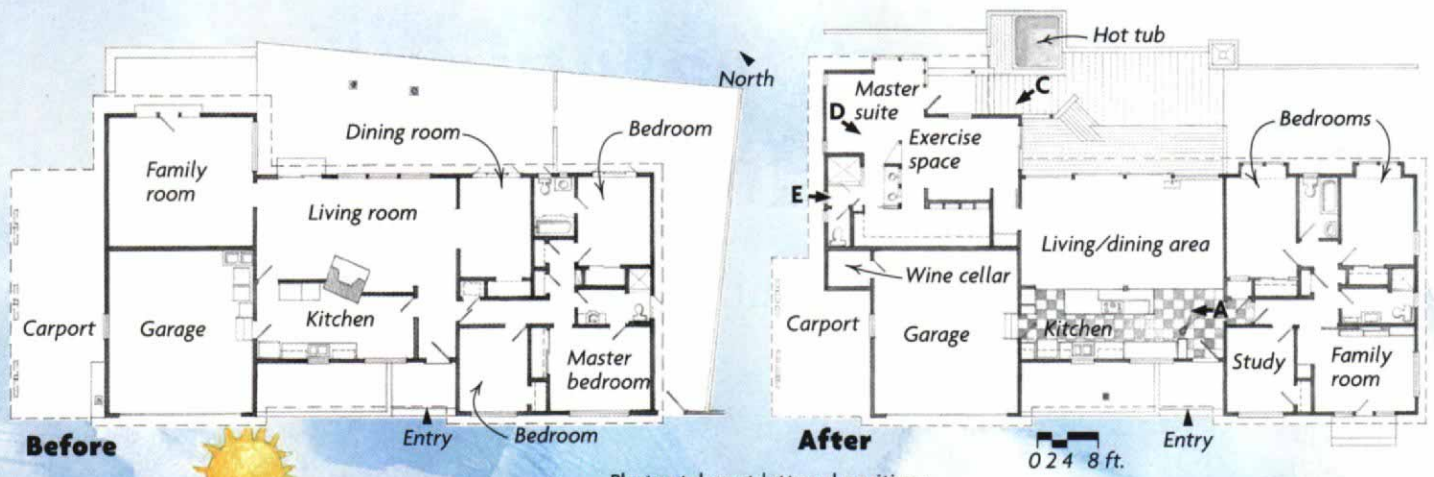
Rearranging the floor plan makes better use of space

We first rearranged the use of spaces within the existing plan to create a master suite. In the public space, we removed walls between the kitchen, living room and entry to create one large great room (drawings p. 100). Flooring materials and ceiling heights still define the different functions without obstructing sight lines.

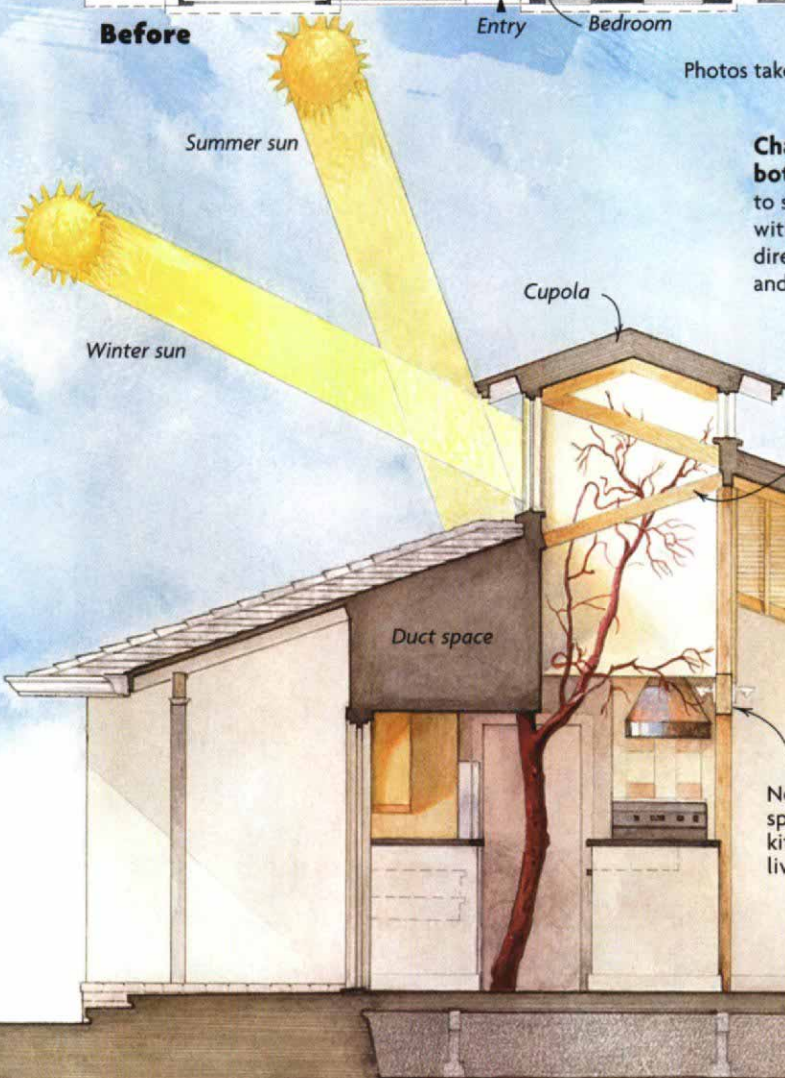
The former family room, a flat-roofed 1960s addition on the northwest corner of the house, was enlarged to become a master



Lighting a dark ranch. The cupola adds daylight to the entire main living space and, through an interior window, to a bedroom. The front of the cupola faces southwest. The windows are fixed, but vents at each end are operable from inside, to be left open in summer and closed in winter. Photo taken at B on floor plan.



Photos taken at lettered positions.



Changes to the floor plan and roofline ease the circulation of both people and light. Walls were removed and rooms were rearranged to separate private and public spaces. Combining the cupola and clerestories with the more-open floor plan and raised ceiling heights takes advantage of direct sun throughout the day, overcoming the original ranch's dark rooms and disregard for site orientation.

Madrona column defines main entry at kitchen.

suite. This arrangement gave the master bedroom both more privacy and more space, including access to a back deck.

The existing master bedroom became the family room, facing south onto the front patio and the street, a much sunnier and more suitable location for a public room. With the former dining room reclaimed as a child's

bedroom, the four rooms in the front became "the girls' wing," a sanctuary for the Palters' two daughters as they grow. That includes two bedrooms, the family room and a study.

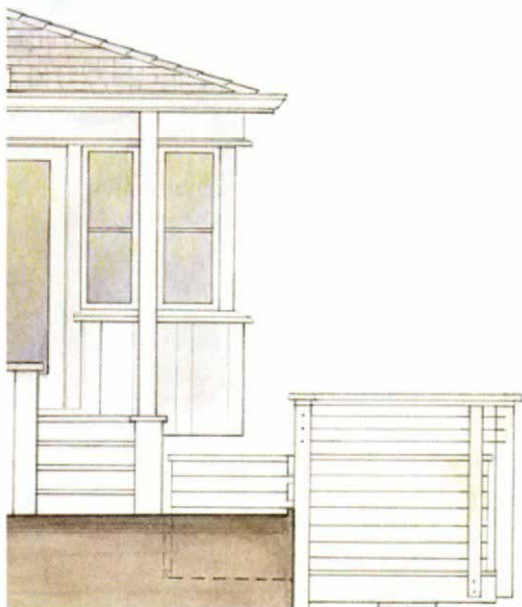
A cupola lights the main space

The most difficult design issue was how to fill the north-facing great room with light.

Removing walls and an awkward fireplace opened up the main space, but that space would still have felt dark with the existing 8-ft. ceiling and north-facing orientation. So we added a cupola just to the south of the roofridge and removed the living-room ceiling, bringing light deep into the north-facing room (drawing above).

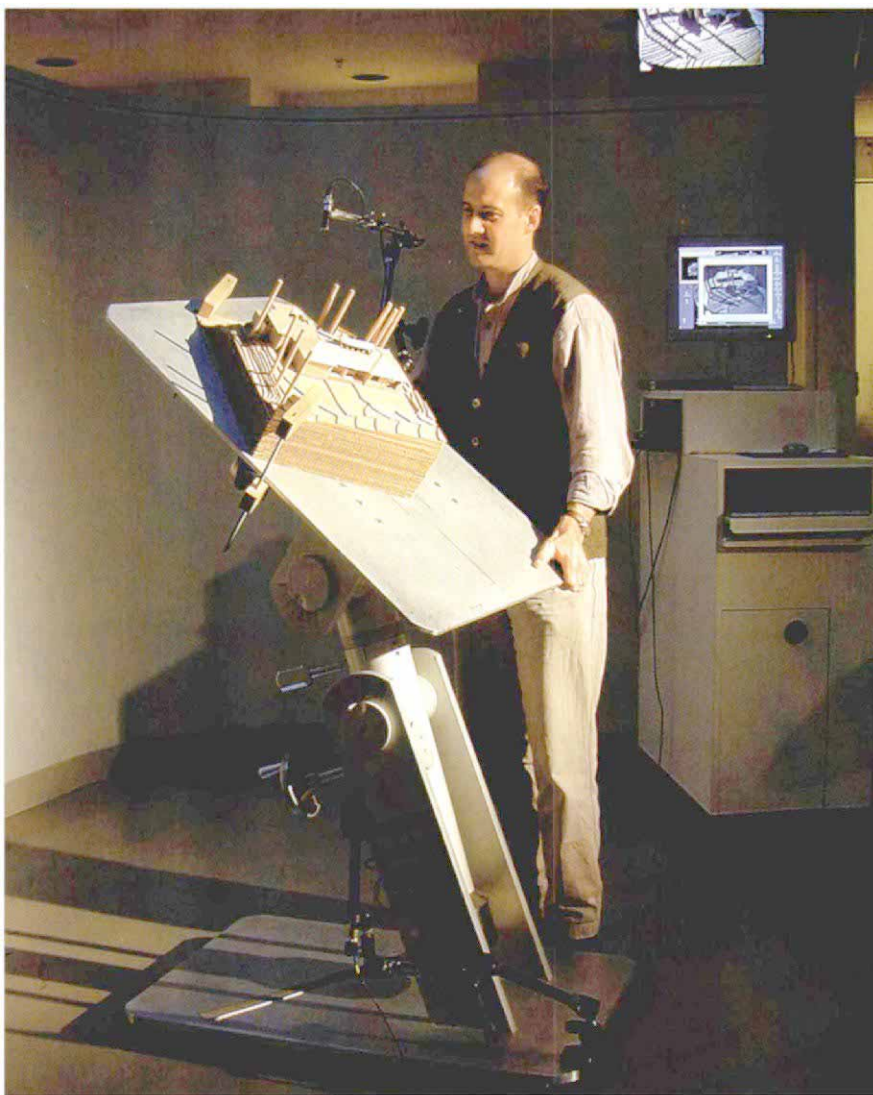


Reaching for the sky. Above the madrona tree, the cupola adds 62½ sq. ft. of glass to light the kitchen and great room. Overhangs limit intense summer sun but allow the winter sun to enter.



As is typical in our design process, we built a model of the house to test for daylighting and solar gain on the Heliodon (which simulates the sun's path on any day of the year) at Pacific Gas and Electric's Energy Center in San Francisco (sidebar above right).

Because the rafters and skip sheathing were still in good condition, we removed the 8-ft.



DESIGNING FOR THE SUN

A heliodon models the sun's path across a stationary object. Pacific Gas and Electric Company's Energy Center (www.pge.com/pec; 415-973-7268) makes its heliodon available to architects and builders.

The sun (a spotlight) shines on a table that rotates to reproduce the sun's daily path across a house at any given latitude and time of year. A small fiber-optic lens, placed either inside or outside the model of the house, videotapes

the sun's interaction with the building. On the Palters' home, the heliodon helped us to size the overhang on the cupola and to study the effects of the clerestory windows on the master bedroom and the bathroom.

-A.T.

ON-LINE CONNECTION

See the heliodon video of this house model at finehomebuilding.com.

ceiling and filled in the skip sheathing by alternating new boards with the old ones. Then we bolted 2x6s directly above the existing 2x4 rafters, filling the 5½-in. bays with sprayed cellulose insulation, and applied new plywood sheathing and asphalt shingles. With the new ceiling, the whole living-dining space connects to the cupola,

adding much-needed volume and light (photo p. 98).

The cupola windows are fixed (photo above left), but separate vents at each end, operated by a pull chain, allow air to circulate through the interior and out of the attic space.

We kept the ceilings in the entry and kitchen low for scale and definition. A



The drama is on the inside. Hidden behind a hip roof that ties a flat-roofed 1960s addition into the roof line of the rest of the house, clerestory windows deliver southeastern light to the new master suite. Photo taken from roof level at C on floor plan.



A clean, well-lighted place. The third window in the clerestory lights the master bedroom. High ceilings that follow a new hip roof and an open floor plan make the most of the light from these and other windows. A walk-in closet is accessible through the bathroom and the exercise room. Photo taken at D on floor plan.

madrona-trunk column, harvested by the owners and ourselves, separates the entry door from the kitchen, connecting the space visually to the trees outside (photo p. 98).

Clerestories light the master suite

To create the master-bedroom suite, we wrapped a modest 168 sq. ft. around the flat-roofed '60s addition. A new hip roof visually ties the addition back into the original house and holds the southeast-facing clerestory windows that light the added space (photo above). Two of these windows light the bathroom (photo facing page); the third window adds supplemental light to the bedroom (photo left).

The master suite is a collection of discreet spaces. The main space is currently an exercise room connected to a walk-in closet. The bed space features bamboo flooring that continues into the bathroom, a high ceiling that slopes up toward the clerestory window and a bay window to the canyon. A low trio of triangular shelves, using the space between an interior wall and a structural column, creates a minimal division between the bed and exercise spaces.

The master bath, while small, works because it is tall and filled with light. Clerestory windows flood the room with southeastern light while just below the clerestories, matching fixed windows allow interior light to be shared between the bathroom and exercise room. A tall, narrow northwestern window balances the light. The top portion of that window is clear and opens for ventilation, while the lower portion is glazed for privacy. A full-wall mirror above the double sink visually enlarges the space, as does a clear-glass shower wall. □

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High ceilings and clerestory windows make this small bathroom feel larger. Above the mirror, fixed windows trade light with the exercise room beyond. Photo taken at E on floor plan.