THE SMALL HOUSE

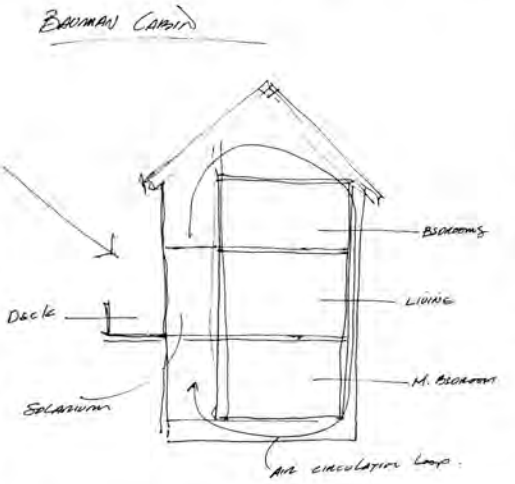
An Artful Guide to Affordable Residential Design

Duo Dickinson

With a Foreword by Turner Brooks

Wrapped in Wood and Air

Two Idaho architects provide maximum energy efficiency while effecting a dramatic design for a home.



Steven Trout and Mark deReus were partners when Dr. Gerald Bauman approached them to design a rural retreat. DeReus took up the challenge, assisted by Trout. Subsequently the partnership dissolved amicably, with deReus heading for San Francisco and Trout building his own house near the site where the good doctor had his second home built. Consequently, Trout more or less helped Dr. Bauman implement deReus's design.

With the batons all duly passed about, the home is indeed the winner of this group effort. Its massing is extremely simple, while its internal engineering approaches the state of the art in energy efficiency. There are great pains taken in this design to gather heat from the sun, recycle it, and thoroughly insulate the heated parts to minimize loss. The house is of an envelope design; a continuous air plenum is created about the nongable walls and through the roof. The glazed southerly portion of this loop of space serves as an active solar collector, with the rest of the double-wall construction aiding in air distribution and providing insulating value.

The extraordinarily brutal Idaho temperature swings necessitated energy awareness in design, but much of this house is essentially a sophisticated machine assisting air flow to manage the internal microclimate. Aesthetically compliant to the technological overview, this house maintains its integrity as a house form, avoiding a protoscientific image. Part of the essence of both its efficiency and its successful blend of engineering and domestic aesthetics is its reduced size. The strenuous spatial demands of providing a convection space running the entire 30-foot length of the house while simultaneously minimizing the volume of air to be treated required skillful resolution. If the house was simply intended to be an experimental machine for heating, then the architects' job would be cut and dried and this house would not be in this book. Instead the house had noble intentions of being a casually lovely abode despite the severe imposition of the air-moving mechanisms. These aesthetic intentions were realized only because clear-headed architects adapted engineering theory to human needs, to the site used for the house, and to their own personal views of the state of domestic aesthetics.

As mentioned, the two dominant means to addressing energy-efficient design in this house were the use of the overt air-management system of the continuous air plenum about the long direction of the house form and the conscientious attempt to limit the amount of air to be heated by reducing the size of the inhabitable house itself. The first effort could have been simply a technological tack-on, with a southerly greenhouse feeding heated air to a continuous interstitial space wrapping about the roof and north wall and through the basement. Instead, deReus opted to integrate the southerly convection space in form and use its dramatic verticality to embrace expressive elements of structure, internal deck, open stair, and hot tub. The exterior simplification to reduce both heat-radiating surface and air volume could have resulted in a stark, formal black box. But again the architect utilized an unheated garage to extend a shed roof and applied an extensive array of multilevel decks to enliven the exterior form, as it projects into a ravine. These decks also serve to expand the house functionally in the fair weather. Last, an applied shed roof over one corner of the deck

ARCHITECT'S STATEMENT

This is a solar house built on a steep hill overlooking a valley and mountain range beyond. The solar aspect of this house is an envelope concept. There is an enclosed solarium on the south, where the sun's heat is collected as it passes through the large glass wall. This heated air then rises into the double-roof system. As it cools, it falls through the double north walls and floor. The air is then reheated in the solarium and continues its path.

The owners report that the system works very well and that plants can survive the 20° below zero winter without additional heat.

The cabin is three stories high and is small, consequently an open floor plan was utilized for the main living space. The vertical circulation is in the solarium, as is a spa.

Steven Trout

LIST OF PARTICULARS

Bauman cabin

Location: McCall, Idaho

Architects: Mark deReus assisted by Steven Trout

Budget: Not available

Nominal space: 2100 square feet

Perceived space: 2700 square feet

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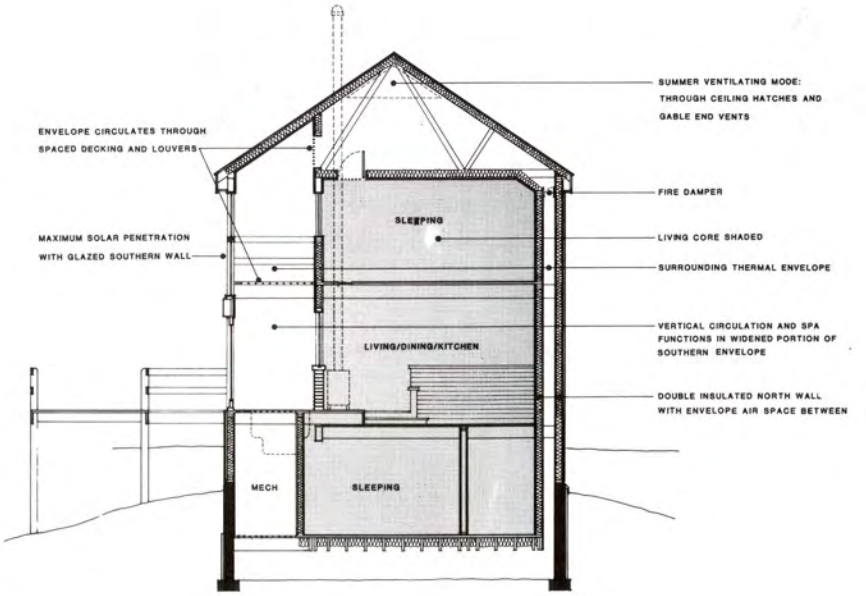
All photos by Steve Trout



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All drawings by Mark deReus

Figure 1 *Entry, south. Perched on the edge of a dramatic drop, the house addresses the view with little apprehension. A simple gable form has a shed applied to its west side; the intersection of these two forms becomes the entry. The deck springs forth at this intersection as well. Note the thoroughly expressive, diagonal structural bracing seen through the transparent southerly skin (behind which sits the heat-generating end of the continuous air-circulation loop).*

Figure 2 *Solar section.*

Figure 3 *Southeast. A simple house form sits upon a steep grade, producing the opportunity for formal drama. Eave lines and deck edges are implicitly linked—through consistent sizing, finish, and treatment—as horizontal layering lines.*

Figure 4 *The convection wall. The major facade feature of the house is the thoroughly glazed southerly wall, allowing for maximum solar gain, while expressing the framing of the house structure.*

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Figure 5 *The convection space. Facing east, the open wall of air is given scale by the imposition of deck and open stair. A painted gypsum-board ceiling adds contrast to the unending wooden detailing.*

Figure 6 *Convection space, facing west. A lofty space and expressed structure convey a grand scale and specific structural detailing. Note the open rails, stair risers, and diagonal bracing. Note, too, the custom steel brackets at all significant corner conditions of the framing.*

Figure 7 *Adequate counter and table space is effected by a tight galley organization, combining usable floor area with circulation space on a one-for-one basis. Both of these features are good examples of efficient planning. Note the open beaming and exposed floor deck underside above.*

Figure 8 *Living area. With thoroughly integrated seating, the occupancy per square foot is maximized. The potential for preceptual squeeze is eliminated by the open orientation out through full-width corner glazing. Spatial distinction from the adjacent kitchen-dining area is effected by a slight level change and a low wall divider.*

Figure 9 *Bedroom. Use of north-wall built-ins provides storage space to free up southern exposure and thus relieve the potential squeeze of a small bedroom.*

Figure 10 *Floor plans. The entry level is set to accept traffic at grade, while the drop-off facilitates an isolated master bedroom below (and space for a future playroom). Guests' beds are given an overlook posture above the basic house mass. The entry-level flow is given over to all public functions, with all wet and storage areas aligned to the blank north wall (which also contains the return-air plenum). Held distinct from these public spaces is the 7-foot southerly bay of double-height convection space that links the top two floors and provides access to the lower floor while accommodating an upper balcony and lower hot tub. The decks applied to the south and east sides provide spatial relief from the tight floor plan of the enclosed public areas.*

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both mimics the garage in form and further extends the reduced house mass perceptually. The exterior surfaces are all natural materials, either lightly stained clapboards or unfinished cedar shingles left to weather. The eaves are broad, but the overhangs are not extraordinary, as the depth of the southerly convection space serves to screen out unwanted summer overheating.

The plan responds to these formal and technological limitations to both condense serving spaces for efficiency and to orient those spaces that should not be constricted—living room and bedrooms—to the fabulous views offered up by the hilltop site.

Structurally the house is a post-and-beam construction, allowing for exposed framing and open floor cavities. The ubiquitous exposed wood is thoroughly evocative of the classic cabin, made aesthetically rich by a flood of finished wood surfaces.

The kitchen is a tight galley with wraparound storage wall; the dining area is then nestled within the kitchen's dense arrangement of storage. The living area uses an integral seating arrangement to maximize the human accommodation per square foot. Baths are part of the narrow bay of opaque spaces oriented to the north wall (including the air-return space noted); the bedrooms themselves are separated from the entry-living floor into children's or guests' rooms above and master bedroom below. The upper-level bedrooms have an interior deck set in the large-scale convection space, while the lower-level bedroom launches its own distinct deck into the ravine.

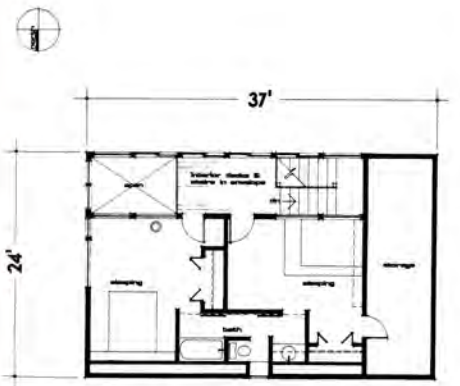
The interior is laminated with pine, except for the ceilings, which are of painted gypsum board. Simple custom built-ins for storage (also of pine) create a sense of a thoroughly efficient, customized interior.

The single thoroughly uncompromised space in the house is the most energy-imperative—the double-height southerly convection hall. Its verticality, its glass-shrouded openness, and its expressively inserted elements evoke a powerful sense of space—powerful enough to allow the main body of the house to become subdominant without apparent compromise.

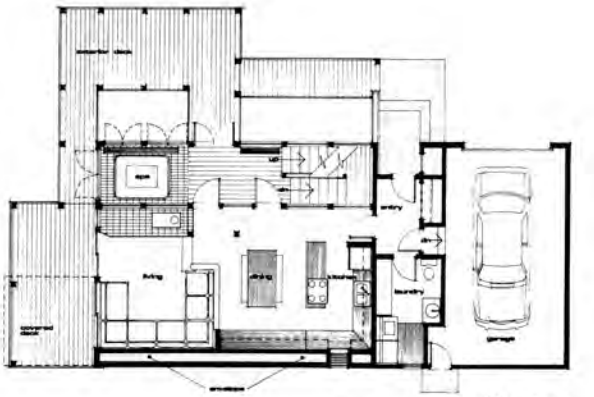
It is not enough to simply reduce the square footages applied to a house to create a reduced-size home. The effects of unconsidered constriction chafe our senses and bind our spirits to the point where livability becomes questionable.

The implications of creating an envelope house were drastic to the planning and massing of the Bauman cabin. Similarly the site had to be recognized. And last, if the volume of space was not fine-tuned to effect the maximum benefit of all the attention to technology, then the home would simply be an inefficient use of a great deal of creative thought.

Mark deReus, with Steven Trout's help, has not only solved the obvious problems of making this home habitable and functionally innovative, he has addressed the subtle problems of formal expression, spatial relief, and perceptual hierarchy. The results mesh science, art, and the human spirit with a quiet brilliance perfectly compatible with the beautiful wilds of Idaho.



Upper Level



Main Level

Lower Level

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