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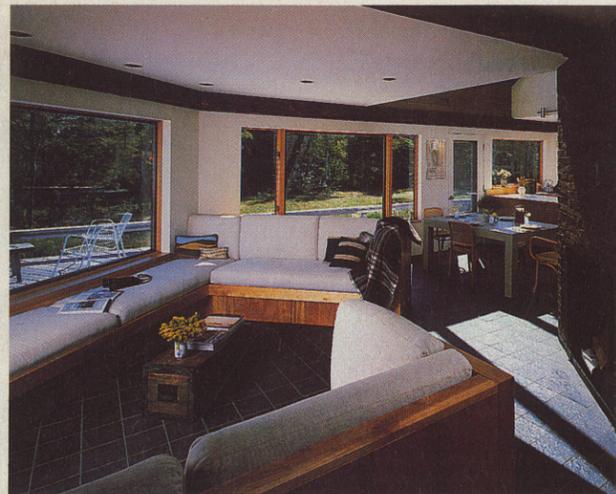


A sophisticated approach to the

SELF- SUFFICIENT HOUSE



A house for all seasons,
this northern New England coastal
home demonstrates a down-to-
earth response to self-reliant
living, within a distinctive
contemporary framework



Planted in a sunny field once used to cultivate strawberries, Darwin and Jacqueline Davidson's vacation house is a striking example of beauty and function working toward the common goal of self-sufficiency.

The Davidsons—Darwin is an architectural photographer, Jackie a free-lance writer—first became enchanted with this colorful, out-of-the-way part of Maine more than 10 years ago, when they were already planning for a relatively self-reliant future—one free from dependence on public utilities for heat and electricity and supermarkets for food. The couple began looking for a suitable ocean-side site, on which they envisioned a spacious, sophisticated house design that would be aesthetically responsive to sunlight and sea.

"However, the right land was just as important to us as the architectural details," Darwin points out.

Happily, they found their ideal spot, 10 acres bordered on the east by the ocean and on the north by a town road. The parcel was blessed with a lovely building site: an old strawberry field surrounded by groves of birch and pine.

By the time the Davidsons contacted architect

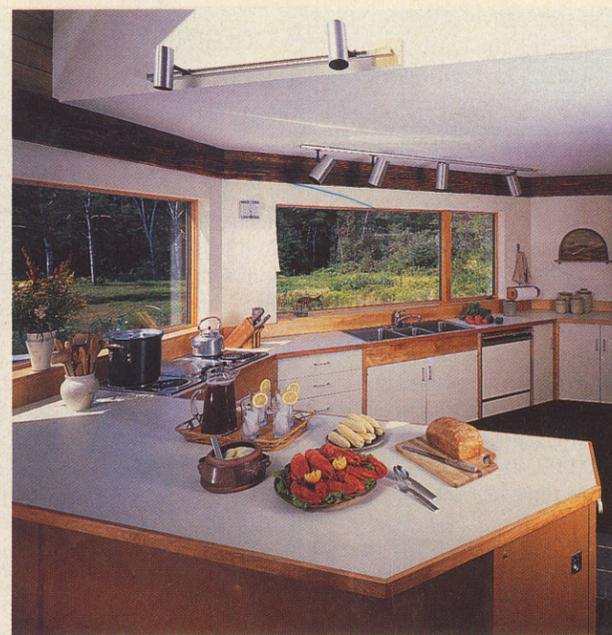
In a sense, the house just grew around the massive fireplace.

Robert Adams, Jackie had conceived an open-plan interior that would fulfill their aesthetic requirements and incorporate some self-sufficient features she and Darwin had been researching: a Russian fireplace, which utilizes a zig-zag flue configuration within a thick masonry wall to radiate maximum heat; and a composting toilet system that works on gravity and natural decomposition rather than conventional plumbing.



Informal living room (top, left) of Darwin and Jacqueline Davidson's year-round vacation home on Deer Isle, Maine, captures ocean views from built-in seating covered in linen. Massive Russian fireplace (above)

serves as the family's main heat source and, at the kitchen end, helps cook their meals. The five plugs, visible on the sunlit brick wall, facilitate creosote cleanout. The tile floor acts as a radiant slab.



Up-to-the-minute kitchen (top) opens to woodsy views and connects to the adjoining dining area (above). Skylight and windows from east to south in the dining room provide natural light throughout the day.

Bob Adams, who has designed 40 energy-efficient vacation houses in Maine, remarks, "It was an interesting design process. We maintained a good dialogue and balanced their commitment to conservation and my shaping of the architecture."

The 2,400-square-foot house that evolved—Darwin acted as general contractor and Bob Adams as construction supervisor—still came close to the Davidsons' original concept. Oriented to the east and south, and partially to the west, the first-floor living spaces are almost completely open to water views. This gives the impression of a beach house—though the building is set back 75 feet from the water's edge—a sensation that's underscored by a nearly continuous band of windows, doors, and a skylight. To prevent sharp shadows and accentuate the feeling of openness, the corners of the Canadian-cedar-shingle exterior walls were clipped at 45-degree angles, a theme that's repeated inside.

At the center of the house stands the massive Russian fireplace. Aesthetically, it forms the core around which daily life revolves; functionally, it's the primary source of heat. Based on a traditional northern European design, this type of fireplace—sometimes called Finnish—works much like a furnace: An intricate flue built into a large masonry mass circulates hot exhaust from one or more wood-burning

fireboxes and stoves through a series of switchbacks. This heats the mass, which in turn radiates warmth into the living spaces that surround it.

The Davidsons' fireplace is an irregularly shaped three-story brick mass, measuring roughly 6' x 16', which encloses a system of five flues. The flues lead to four fireplaces and stoves that complete the system: the main firebox, which Darwin normally fires up twice a day during winter, in the basement;

cast-iron stove/oven insert facing the kitchen, and a Colonial-style fireplace in the living room, on the first floor; and a woodburning unit in the second floor master bedroom.

"In a sense, the house grew around the fireplace," says Darwin. "As the design evolved, the mass kept growing." Built in the spring of 1980—the house was completed in June of that year—the Russian fireplace cost about \$20,000, including its more than 12,000 bricks.

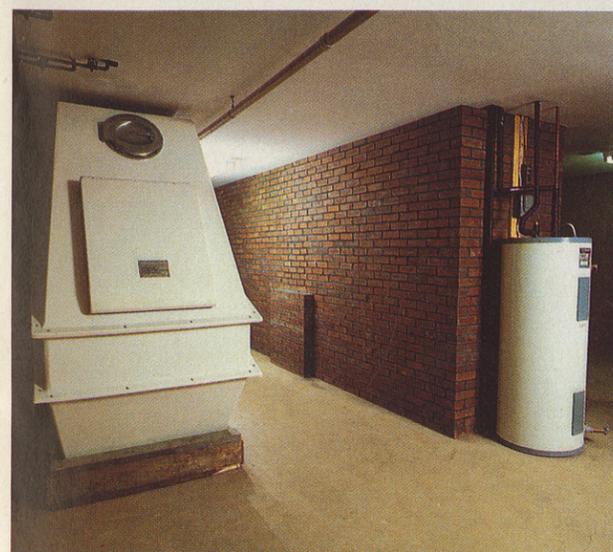
A commitment to conservation is integrated with innovative design.

Considering the absence of fuel bills, except for wood, which costs less than \$400 a year, the Davidsons feel it was a worthwhile long-term investment that will contribute markedly to their self-reliance.

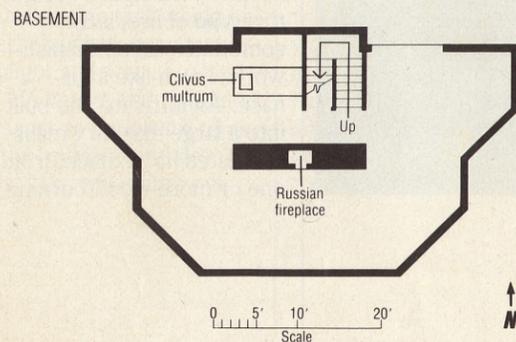
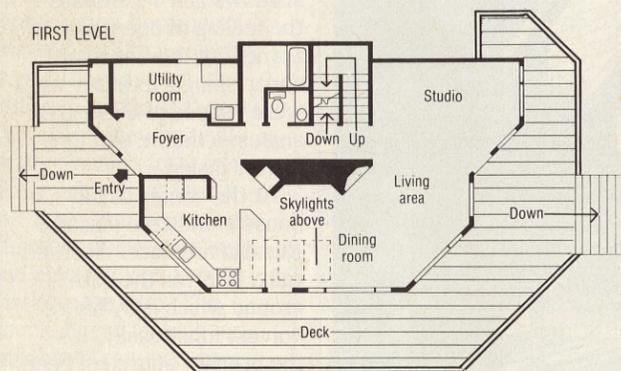
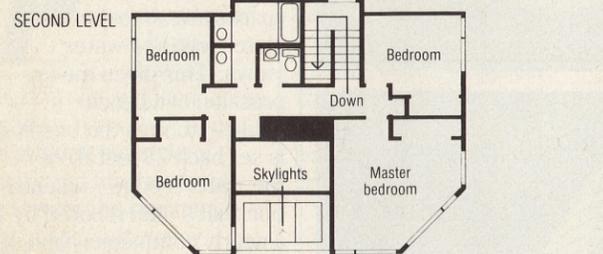
Another energy source that helps the Davidsons keep their money

out of the power company's coffers is the sun. On the first floor, where living and dining areas and part of the kitchen basically face south, low winter rays strike much of the tile floor and part of the already-warm fireplace wall, contributing to the house's heating system. For cooling during the summer months, roof overhangs shade most of these living spaces, and nearly all windows open to admit ocean breezes. Only the dining area, which is directly below the roughly 8' x 11' skylight, sometimes gets uncomfortably warm. According to Jackie, "On those days we usually eat on the deck or the beach anyway." The wraparound deck, made of spruce boards individually shaved to create a decorative radial pattern, adds nearly 1,200 square feet of extended living space and forms part of the home's main entrance on the west.

The sun also has a more active role, with the southern exposure of the house permitting use of solar roof collectors to heat its well-drawn water. Designed by Solar Specialties, of Arvada, Colo., to work on a refrigeration cycle of boiling and condensing



Quilt sewn by Darwin's grandmother and wedding chest that belonged to Jackie's personal master bedroom (above). Oak toilet (near left) drains to composting tank (center left) in basement. Stairwell (far left), halls, and bathrooms are oriented to the house's almost windowless north; living and sleeping areas to the sunny and panoramic east, south, and west.



Stairway at rear leads from open-plan first floor to the four-bedroom second story.

refrigerant, the panels can operate not only in direct sun, but also without sunlight by using ambient heat from the air. The enclosed loop system appealed to the Davidsons because it requires no regular maintenance, and the price was right: in 1980, \$3,000 for pump, two 4' x 7' panels, and installation. The same system to-

Finding the right piece of land was as important as the architecture.

day runs about \$3,500.

In deference to Maine winters, architect Adams incorporated extraordinary amounts of insulation from foundation to roof, placed only two windows on the north, both triple glazed, and used double glazing for all other openings. For their part, the owners recently invested in insulated window coverings that help retain warmth in some of the living areas on cold nights. The highly efficient roller shades consist of sandwichlike arrangements of two layers of reflective fabric, decoratively finished on the outside, but with a metalized film within, enclosing an air space. The Davidsons are so satisfied with the shades that they plan to have the kitchen and bedrooms similarly insulated before next winter.

As part of their long-term plan for independence, Darwin and

Jackie opted for a composting solid-waste system that, unlike conventional flush toilets, requires no water to operate. Invented in Sweden during the 1940s, and now manufactured in the United States, the Clivus Multrum Organic Waste Treatment

System works like an indoor compost pile: inlets in the bathrooms and a chute in the kitchen release organic waste into a large holding tank, located directly below in the basement. The interior chamber of the tank is built on a 30-degree incline and, over a period of time, usually two years or so, the gradually decomposing wastes slide

to the base as compost. When properly maintained—regularly pouring sawdust or peat moss down each chute and removing accumulated liquids from the holding tank—the system is relatively odorless and worry-free. A vent from the tank to the roof and a small 14-watt fan in the attic provide the necessary ventilation, though

where electricity is not available, natural air flow can do an adequate job. At the time the house was built, the Clivus Multrum cost about \$2,000. A similar set-up today, redesigned for easier installation and for retrofit of older houses, insulated, and equipped with fixtures that resemble standard toilets—the Davidsons' have

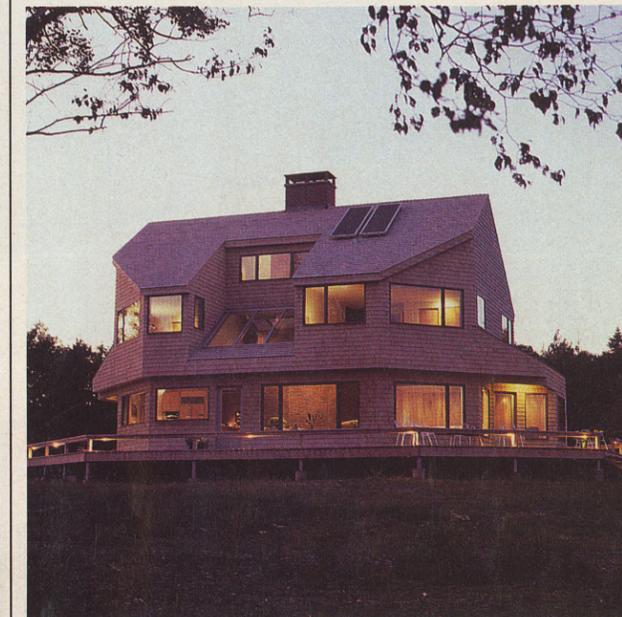
barrel-shaped oak bases and plastic lids, not conventional fixtures—will total about \$3,900.

Firmly committed to their energy-efficient home, the Davidsons' plan for self-sufficiency includes a small generator for emergencies that will create electricity to work the pump for the well, the compressor for the solar



panels, the fan for the compost system, and the more obvious creature comforts like the refrigerator and the lights. Darwin reflects, "In a few years, when we make Deer Isle our permanent base, we'll buy the generator, build a barn, buy some animals, grow vegetables, and cut our own wood!"

CHRISTINA NELSON



Heralding a new day, white cedar shingles and spruce decking take on a ruddy cast (left). The deck wraps around all but the north face of the house (above), adding 1,200 square feet of outdoor living space. Two solar panels visible on the roof heat the family's water.