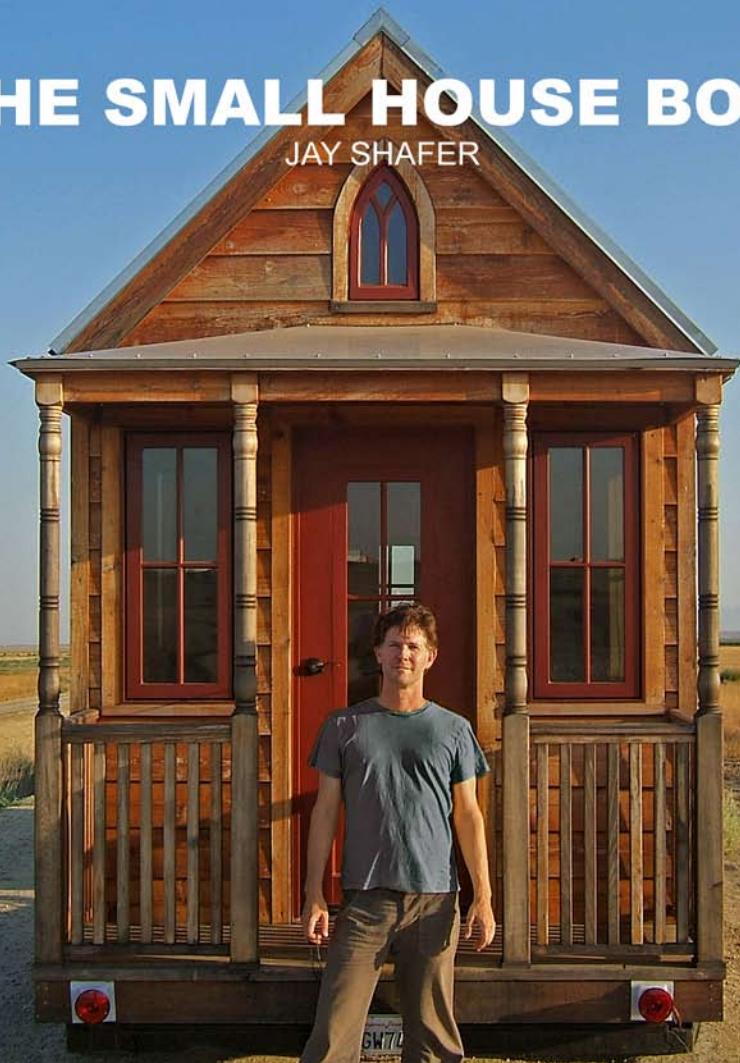


# THE SMALL HOUSE BOOK

JAY SHAFER



# Contents

<b>Introduction</b>	4
<b>Confessions of a Claustrophile</b>	6
<b>A Good Home</b>	24
<b>Making Space</b>	64
<b>Portfolio of Houses:</b>	120
New Popomo	122
XS-House	124
Epu	130
Weebee	138
Burnhardt	146
Lusby	150
Tarleton	156
Fencl	160
Bodega	164
Harbinger	166
New Vesica	168
Loring	170
Enesti	172
Sebastorosa	174
B-53	176
Z-Glass House	178
Whidbey	180
Biensi	182
Wildflower	186
Tvee	188
Vardo	190
<b>Endnotes</b>	195
<b>Biography</b>	196
<b>Endorsements</b>	197

# Introduction

I live in a house smaller than some people's closets. My decision to inhabit just 90 square feet arose from some concerns I had about the impact a larger house would have on the environment and because I just do not want to maintain a lot of unused or unusable space. My house meets all of my domestic needs without demanding much in return. The simple, slower lifestyle it affords is a luxury for which I am continually grateful.

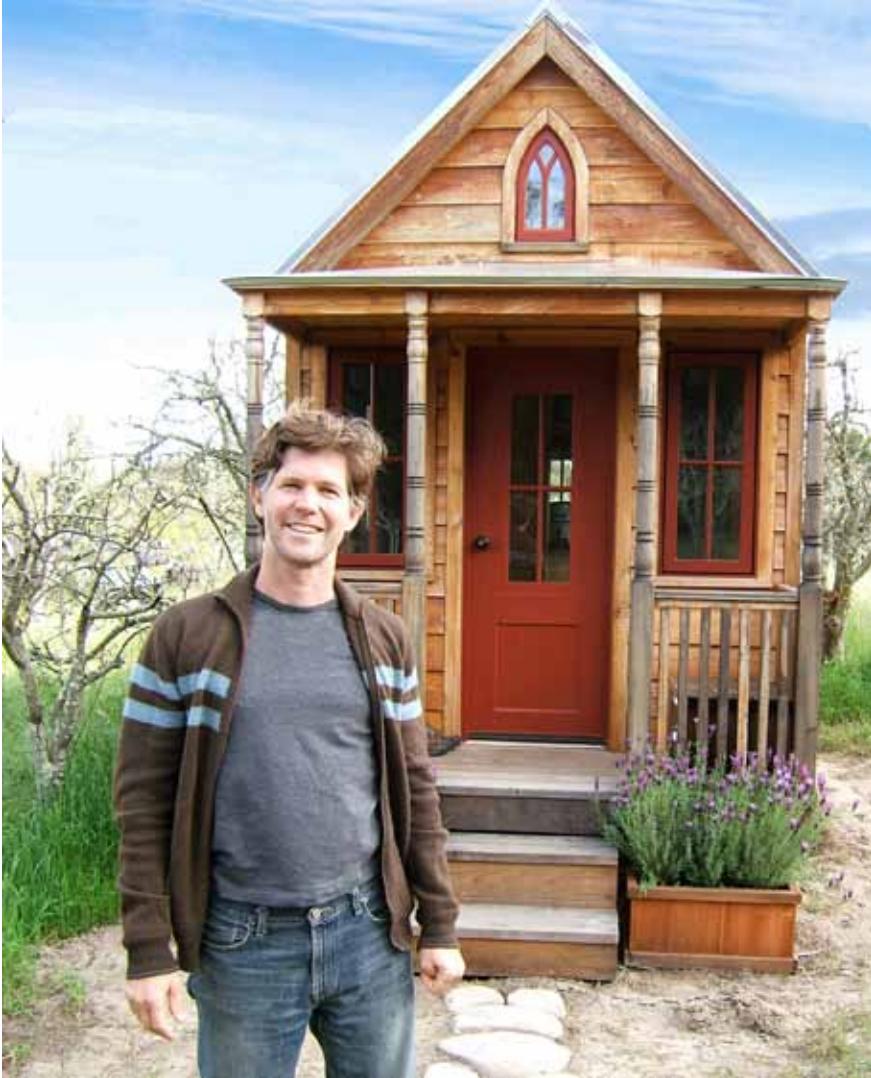
If smaller, well-designed houses aren't the wave of the future, they certainly are a significant ripple on that wave. On these pages, I explain why. I also share my personal experiences with living in diminutive homes, meeting codes, and designing small spaces that work.

This book is a revised edition of the one I published several years ago under the same title. To this edition, I've added a section on how to build your own tiny house and a portfolio of my own designs. I hope you enjoy it.

Sincerely,

A handwritten signature in blue ink, consisting of a large, stylized 'J' and 'S' that are intertwined, followed by a horizontal line that tapers off to the right.

Jay Shafer



Jay, at home.



*“There is only one success – to be able to spend your own life in your own way.”*  
-Christopher Morley

**PART ONE:  
CONFESSIONS OF A CLAUSTROPHILE**

# Living Large in Small Spaces

## The Airstream

I have been living in houses of fewer than 100 square feet for nearly twelve years. The first of my little abodes was a fourteen-foot Airstream. I bought it in the summer of 1997 for three thousand dollars. It came as-is, with an aluminum shell as streamlined and polished as what lay inside was hideous. The 1964 orange shag, asbestos tiles, and green Formica would have to go.

I began gutting, then meticulously refurbishing the interior in August, and by October, I was sleeping with an aluminum roof over my head. The place looked like a barrel on the inside, with pine tongue-and-groove running from front-to-back and floor-to-vaulted ceiling.

I settled in on a tree-lined ridge at the edge of a friend's alfalfa field. It was a three-minute walk to Rapid Creek Road and a ten-minute drive from there to Iowa City. I carried water in from a well by the road and allowed it to drain from my sink and shower directly into the grass outside. I carried my sawdust toilet (i.e., bucket) out about once a month and took it to the sewage treatment facility in town. My electrical appliances consisted of a fan, six lights, a 9-inch TV/VCR and a small boom box. A single solar panel fed them all. It seemed that this simple existence would provide all I needed.

Then December came. I had reinforced most of the trailer's insulation, but some areas remained thin. I spent over a half-hour each morning, from Christmas until Valentine's Day, chipping ice and sponging up condensation from my walls, floors and desktop. This went on for a couple of winters before I began construction on the tiny house I have since come to call "Tumbleweed".



The Airstream's exterior...



... and interior.

## Tumbleweed

It was not until after I thought I had already finished designing my little dream home that I became familiar with the term “minimum-size standards.” Up to this point, I had somehow managed to remain blissfully unaware of these codes; but, as the time for construction neared, my denial gave way to a grim reality. My proposed home was about one-third the size required to meet local limits. A drastic change of plans seemed unavoidable, but tripling the scale of a structure that had been designed to meet my specific needs so concisely seemed something like altering a tailored suit to fit like a potato sack.

I resolved to side-step the well-intentioned codes by putting my house on wheels. The construction of travel trailers is, after all, governed by maximum - not minimum-size restrictions, and since Tumbleweed already fit within these, I had only to add some space for wheel wells to make the plan work.

At about eight by twelve feet plus a porch, loft, and four wheels, the resulting house

looked a bit like American Gothic meets the Winnebago Vectra. A steep, metal roof was supported by cedar-clad walls and turned cedar porch posts. The front gable was pierced by a lancet window. In the tradition of the formal plan, everything was symmetrical, with the door at exterior, front center. Inside, Knotty Pine walls and Douglas Fir flooring were contrasted by stainless steel hardware. There was a 7' x 7' great room, a closet-sized kitchen, an even smaller bathroom and a 3' 9"-tall bedroom upstairs. A cast-iron heater presided like an altar at the center of the space downstairs. In fact, the whole house looked a bit like a tiny cathedral on two, 3,500-pound axles.

The key to designing my happy home really was designing a happy life, and the key to that lay not so much in deciding what I needed as in recognizing all the things I can do without. What was left over read like a list I might make before packing my bags for a long trip. While I cannot remember the last time I packed my TV, stereo, or even the proverbial kitchen sink for any journey, I wanted this to be a list of items necessary not only to my survival, but to my contented survival. I am sure any hard-core minimalist would be as appalled by the length of my inventory as any materialist would be by its brevity. But then, I imagine nobody's list of necessities is ever going to quite match anybody else's. Each will read like some kind of self-portrait. I like to think that a house built true to the needs of its inhabitant will do the same.



## Utilities

Like the rest of the house, utilities and appliances were designed with simplicity and sustainability in mind. They met my modest needs but would be considered primitive by conventional American standards. These rudimentary utilities certainly would not appeal to everyone interested in living in a small home, and it should be made clear that living small does not require deprivation. Hot and cold running water, a microwave oven, and cable TV are all available options.

**Water:** Tumbleweed was supplied by a simple, gravity-fed plumbing system. A two-and-a-half-gallon pot sat on a metal shelf just above a horizontal section of stovepipe in the overhead kitchen cabinet and drained into either the kitchen sink or shower through a Y intersection in a short stretch of rubber hose. The water was kept warm as long as the heat stove was on, and it could be made hot by setting the pot directly on the stove or a burner. The pot was filled at a nearby spigot. Gray water drained directly into the garden.

**Heating and Cooking:** The best source of heat most structures can use is that of the sun. I installed windows on all but what was intended as the north wall of Tumbleweed for good solar gain. A covered porch on the south side kept the heat of the high summer sun out while letting the lower winter rays flood the house with their warmth. A gas heater kicked in on cloudy days and cold nights. I chose a gas stove over a wood one mostly because gas stoves only require about one-sixth as much clearance from flammable surfaces. This, in turn, allowed me to have pine walls without having to put my heater right in the middle of an already tiny room. The cleanliness of gas also seemed to make sense in a small space, and I liked the idea of precise control with a thermostat rather than the frequent stoking that a small wood stove requires.

The propane tank that fed the heater also supplied an R.V. cooktop. It is upon this same double burner that a camp oven was set for baking.

Toilet: My composting toilet amounted to little more than an airtight bucket, a can of sawdust and a couple of compost piles outside. Sordid story short, the bucket was used as an indoor toilet and sawdust was put into the mix to absorb odor and balance out the carbon-to-nitrogen ratio. This bucket was emptied onto one compost pile or the other every so often, then rinsed. (Please see J.C. Jenkins, *The Humanure Handbook*, for details on this and other methods of composting human manure.) While the idea of carrying one's own poop (or anybody else's for that matter) to a compost pile off away from central living quarters may sound both inconvenient and plainly unacceptable to most Westerners, its appeal for more than a few will be its absolute efficiency. Without electricity, running water, or waste and only small inconvenience as its price, a cleaner environment and soil-building compost are made available.

Electricity: By now, these description of rudimentary plumbing and a plastic chamber pot may have made it sound as if my house was more derelict than homey. But, as I have said, these utilities were of my choice, and for me, choice is, in itself, a luxury. In fact, there was plenty of room for modern conveniences. The integral CD player, TV, and VCR disqualified the house as an ascetic's shanty. These appliances, along with six lights, two fans, and a radio, were all powered by the sun through a single solar panel. I chose not to mount the panel on my roof but kept it separate. This allowed me to situate the house in a shady place during the summer while collecting energy at the same time.





## Camping Out

I had managed to side-step building codes by constructing not a building, but a “travel trailer.” With that stumbling block out of the way, I still faced a zoning problem. I wanted to live in town, and, like most towns, Iowa City does not allow trailer camping just anywhere. You cannot just buy an old lot and park there indefinitely. The restrictions do, however, allow for “camping out” in one’s own backyard.

Upon discovering this, I snatched up a small fixer-upper on a large wooded parcel and proceeded to set up camp. The rent collected from the big house covered the ensuing mortgage and taxes. I would “camp out” in my own backyard for the next five years before selling the property and heading West.

## California

In 2005, I moved to the San Francisco Bay Area. I had heard a lot of horror stories about the price of properties in the region, so I sold Tumbleweed and built myself an even smaller house to take with me. I figured I had better have something I could parallel park, in case I had to live on the street for a while.



Tumbleweed's ladder (above), kitchen (opposite) and exterior (page 18)









XS exterior (page 19), loft (above)...



... and downstairs.

I called my next home XS-House (as in, “extra small”). It measured about 7’ x 10’. Like Tumbleweed, it was on wheels, it had a steep metal roof, classic proportions and a pine interior punctuated by a metal heater on its central axis. A bathroom, kitchen, and sleeping loft featured essentially the same utilities as my previous residence. Unlike Tumbleweed, there was a four-foot long, stainless steel desk and a couch, and the exterior walls were clad in corrugated steel.

All things considered, my move westward went smoothly. Gale-force winds broadsided my tiny home all the way from Omaha to central Nevada, but both the house and the U-Haul came through unscathed.

I parked in front of the Sebastopol Whole Foods for three days. The U-Haul was almost due when a woman approached to ask if I would consider parking on her land to serve as a sort of groundskeeper. I would live just yards from a creek at the edge of a clearing in the redwoods. I would pay nothing and do nothing other than reside on the property. I was lodging amongst the redwoods by nightfall.

With my fear of having to live on the streets allayed, I built a new house and sold the XS before I had even settled in. I call my most recent domicile, "Tumbleweed 2." At 8' x 12' with a steep, metal roof over cedar walls, it looks just like the first Tumbleweed on the outside. I reconfigured the inside to accommodate a couple of additional puffy chairs and a five-foot long, stainless steel desk. I have been living in this house for nearly three years, and I have no intention of moving out any time soon (see pages 24 and 130 - 137 for photos).

## **The Method and the Madness**

My reasons for choosing to live in such small houses include some environmental concerns. The two largest of my three, hand-built homes were made with only about 4,800 pounds of building materials each, less than 100 pounds of which went to the local landfill. Each produced less than 900 pounds of greenhouse gases during a typical Iowa winter. And, at 89 square feet, plus porch and loft, each fit snugly into a single parking space.

In contrast, the average American house consumes about three quarters<sup>1</sup> of an acre of forest and produces about seven tons of construction waste. It emits 18 tons of greenhouse gases annually, and, at more than 2,349 square feet, it would most definitely not fit into a single parking space.

Finances informed my decision, too. Quality over quantity became my mantra. I have never been interested in building anything quite like a standard travel trailer or mobile home. Travel trailers are typically designed for more mobility and less year-round comfort than I like, while most manufactured housing looks too much like manufactured housing for my taste. Common practice in the industry (though not inherent or exclusive to it) is to build fast

and cheap, then mask shoddiness with finishes. This strategy has allowed mobile homes to become what advocates call “the most house for your money.” It has, in fact, helped to make manufactured housing one of the most affordable and, thus, most popular forms of housing in the United States today.

This is pretty much the opposite of the strategy I have adopted. I put the money saved on glitz and square footage into insulation, the reinforcement of structural elements, and detailing. At \$30,000, Tumbleweed cost about one-sixth as much as the average American home. Only about \$15,000 of this total was actually spent as cash on materials. That is less than half of what the average American household spends on furniture alone. The remaining \$15,000 is about what I would have paid for labor had I not done it myself.

The cost of materials could have been nearly halved if more standard materials were used. A more frugal decision, for example, would have been to skip the \$1,000, custom-built, lancet window and install a \$100, factory-built, square one instead. But I was, and I remain, a sucker for beauty.

The total cost was low when you consider I was able to pay it off before I moved in—but not so low when you consider that I sunk over \$300 into every square foot. The standard \$110 per square foot might seem more reasonable, but I succumbed to the urge to invest some of the money saved on quantity into quality. As a result, my current residence is both one of the cheapest houses around and the most expensive per square foot.

Still, my main reason for living in such a little home is nothing so grandiose as saving the world, nor so pragmatic as saving money. Truth be told, I simply do not have the time or patience for a larger house. I have found that,

like anything else that is superfluous, extra space merely gets in the way of my contentment. I wanted a place that would maintain my serene lifestyle, not a place that I would spend the rest of my life maintaining. I find nothing demanding about Tumbleweed. Everything is within arm's reach and nothing is in the way—not even space itself.



Tumbleweed 2 (above), Williamsburg, VA (next



*Have nothing in your houses that  
you do not know to be useful, or  
believe to be beautiful.*  
- William Morris

**PART TWO:  
A GOOD HOME**

# A Good Home

A small house is not merely as good as its larger correlate; it is better. A home that is designed to meet its occupants' domestic needs for contented living without exceeding those needs will invariably surpass the quality of a bigger one in terms of sustainability, economics and aesthetics.

## Sustainability

Under no circumstances does a 3,000-square foot house for two qualify as “green.” All the solar gain and reclaimed materials in the world can never change that. At 2,349 square feet, the average American house now emits more carbon dioxide than the average American car.<sup>2</sup>

Our houses are the biggest in the world—four times the international average. Since 1950, the median size of a new American house has more than doubled, even though the number of people per household shrank by more than 25 percent.<sup>3</sup> Not so long ago, you could expect to find just one bathroom in a house; but, by 1972, half of all new homes contained two or more bathrooms. Ten years later, three-quarters did. More bathrooms, more bedrooms and dens, bigger rooms overall, and, perhaps most notably, more stuff, have come to mean more square footage. America's houses have, quite literally, become bloated warehouses full of toys, furniture and decorations, and a lot of things we may never see or use.

As prodigal as this may seem already, even a space capable of meeting our extravagant living and storage needs is not always enough. We still have to worry about impressing a perceived audience. Entire rooms must be added to accommodate anticipated parties that may never be given and guests



The “American Dream”

who may never arrive. It is not uncommon for a living room to go unused for months between social gatherings and, even then, quickly empty out as guests gravitate toward the informality of the kitchen.

Until recently, the issue of over-consumption was conspicuously absent from mainstream green discourse. You are unlikely to find the answer to sprawl offered in a sustainable materials catalogue. Accountable consumption stands to serve no particular business interest. Building financiers and the real estate industry are certainly pleased with the current situation. Bigger is better, from their perspective, and they are always eager to tell us so.

If you do only one thing to make your new home more environmentally sound, make it small. Unless supporting the housing industry is the kind of sustainability you hope to achieve, a reasonably-scaled home is the best way there is to make a positive difference with real estate.

## **Economics**

“Economical” means doing only what is necessary to getting a job done. Anything more would be wasteful and contrary to the inherent simplicity of good design. An economical home affords what is essential to the comfort of its occupants without the added burden of unused space. Excess and economy are mutually exclusive. We can have exorbitance, or we can have the serenity that a sensibly-scaled home affords, but we cannot have both. Like anything else that is not essential to our happiness, extra space just gets in the way. It requires maintenance and heating, and ultimately demands that we exchange a portion of life for the money needed to pay for these extras.

For most Americans, big houses have come to symbolize the good life; but, all symbolism aside, the life these places actually foster is more typically one of drudgery. Mortgage payments can appropriate thirty to forty percent of a household’s income not counting taxes, insurance, or maintenance expenses. When every spare penny is going towards house payments, there is nothing left over for investments, travel, continued education, more time with the kids, or even so much as a minute to relax and enjoy life. At this rate, an oversized house can start to look more like a debtor’s prison than a home.

In 2008, a used house in the U.S. averaged about \$244,000. That is far more than the average American can afford. Affordable housing has, in fact, become the exception. How seldom one hears of moderately-priced real estate

