PART ONE:
THE YEAR OF THE MITE

HOUSE, n. A hollow edifice erected for the habitation of man, rat, mouse, beetle, cockroach, fly, mosquito, flea, bacillus and microbe.

—Ambrose Bierce, The Devil’s Dictionary
Sophie was eight when Monica signed her up for the local farm club and started to lobby for backyard poultry.

“We could save a lot of money on eggs if we kept chickens,” said Monica.

I’d rather eat a golf ball than an egg, but I was outvoted.

“You sure the dogs, the fish, and the snake aren’t enough?” I asked.

“Nope,” said Monica.

She researched chicken coops with the same tenacity she had brought to planning our wedding. Books of coop designs littered the living room. Friends who were involved with Habitat for Humanity cut the plywood shapes for her favorite design, an edifice Monica dubbed “Habitat for Poultry.” On a sunny day in 2008, a bunch of Monica’s friends showed up in our yard for a mini-barn raising. They hammered, they tacked on screen, they installed latches, they painted. When they were done, we had a two-room chicken coop with a fold-out A-line roof, a ramp from the second story to the first, and an impressive coat of bright red paint. It was nicer than a lot of human dwellings.

Monica bought four chickens. Sophie decided to enter one of the hens at the County Fair in 2009, and prepared the bird to show. One day in July I came home from work early with a migraine, craving dark and quiet. Sounds of little girls laughing and running poured in through the bedroom window. Past the
boughs of the backyard oak, I saw Sophie in a lineup of kids bathing their hens on the back deck. Monica was supervising, and the girls were having a great time. The chickens tried their best to escape, panicked in that mindless way only chickens can panic. They understood no more than I why anybody in their right mind would wash a hen.

Despite the noise, the ridiculous scene amused me. Just one of those wacky idiosyncrasies of urban farmer life. I had no clue how important the bathing ritual was, no idea what a dirty hen can carry. I knew nothing then, you see. I knew absolutely nothing.

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One Saturday a few weeks later, I stood at the kitchen sink, barefoot on the Spanish tile. While I did dishes, I looked out the window at the redwood fence that was almost close enough to touch. I picked up a dirty breakfast plate. Monica, behind me, said, “Jane, there’s something I want to ask you.”

I turned and saw her by the stove, looking a little guilty and a little defiant and a little like the cat who swallowed the canary. My partner of nineteen years was strawberry blonde, in glasses, and almost as curvy as me. Our daughter Sophie clung to her arm, nine years old, adorable and hopeful.

“Jane, I moved the baby chicks into the family room. You don’t mind, do you?”

I did mind. In fact, it bothered me a lot. When I was a kid, my mother the nurse told me never to pick up a bird feather or a bird’s nest. I did not know the reason, but my mother was afraid of something. Ever since Monica and Sophie started keeping chickens in the yard, there was always a collection of chicken feathers in a jar on the kitchen windowsill. I asked Monica to get rid of them, but she did not take it seriously. And now the four adult chickens that wandered the yard and shat on the deck were not enough. Monica had bought more chicks at the county fair and brought them into our home.

“I brought in the dog’s cage for them,” she said. “They’ll be safer at first in the house.”
I set down the plate in my hand and crossed the kitchen, opened the door to the family room and looked in. The wire crate that sometimes housed Zach, our Doberman, was set up on the mauve carpet. In the crate were three chicks: a grey one, a striped bard rock, and a yellow one. There had been four, but one had died right away. The chicks chirped and hopped around and, even then, scratched themselves a lot.

“I guess it’s okay,” I said, with doubt in my voice

“Yes!” Sophie said.

There are times in life when we take a calculated risk. And there are times when there is nothing to calculate, when we are reticent without knowing why. In that moment, I had no rational reason to deny Monica’s wish. It took months to comprehend the shape and heft of my mistake.

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It wasn’t like I’d never heard of chicken mites. When we first got chickens, Sophie and I had visited another family with backyard poultry. The mom, Hannah, and I sat in her back yard while our daughters fed and fussed over their hens. Hannah told me how tough it was to enter a show hen at the County Fair.

“It’s crazy,” Hannah said. “The judges are so worried about the show birds catching mites from each other, they examine them with jeweler’s loupes. They found just one dead mite on my daughter’s bird, and that was enough. Even though it was dead, they didn’t let her compete.”

I made sympathetic noises, but I could not understand why anybody would want to send a potentially infested bird to the fair.

But what did I know? Monica and Sophie were the ones going to farm club chicken meetings. Frankly, I was not that interested. I work in biotech, but my real biological interest is evolution. The only thing about chickens that appeals to me is their descent from dinosaurs. In my Hollywood, Jurassic Park would have had a lot more chicken-like movements. Including some scratching.

One of the many things I did not know in those days was that nobody inspects the baby chicks that are sold at the fair. There are
no judges. No jeweler’s loupes. Nothing. As uncontrolled as gun
shows, with comparable results.

For two weeks after the county fair, Monica and Sophie spent
a lot of time in the family room, feeding the baby birds, taking
them out of the cage and playing with them. Monica and Sophie
laughed good-naturedly when the chicks crapped on their clothes.
They encouraged me to join them on the rug and let the chicks
climb on me too.

They wanted me to practice caring for the chicks because
every year, the first week in August, Monica and Sophie go to gay
and lesbian family camp. That trip was coming right up. This year,
home alone, I would be in charge of the baby chicks.

The big day came and off they drove to camp, where they
would enjoy crafts and river swimming with other alternative
families. They left me in charge of Monica’s pets: the baby birds,
along with the dogs and the hamsters and the snake. Well, OK, the
snake was technically mine. So there I was, sitting on the rug in
the family room, watching the alleged baby “hens” bump chests.
I wondered if they were roosters, and their behavior a display of
incipient poultry testosterone.

“Take them out and play with them,” Monica had said, and I
did. I balanced a bird on either knee and watched them try to maul
each other. And as I sat there, something bit my knees. Whatever
bit me was too small to see. I put the chickens back in the cage, and
made the mistake of lying down in bed in the same clothes I had
worn to play with the chicks.

I texted Monica:

_The roosters have mites._

I didn’t know when—or even if—she would get the message.
She and Sophie were up in the Gold Country, where reception
was terrible.

But Monica called me and said, “Whatever is biting you, it
can’t be mites. Chicken mites don’t bite people.”

“How do you know?”

“I learned it at farm club.”

“Oh. OK.”
I thought she knew. I took her word for it.

My mother had warned me not to let Monica get chickens. She told me about the time my grandmother tried to raise poultry back in Indiana and “they all died of some horrible disease.” Of course, back in the seventies my mother had also advised me to marry Frank.

“It’s as easy to marry a rich man as a poor one,” was how she put it. When I left Frank ten years later, I stopped taking my mother’s advice. As Mark Twain said, “If you can tell good advice from bad advice, you don’t need advice.” And if you can’t tell the difference, then good advice can’t save you.

Another hot summer day. Alone with the chicks, I looked at the line of bites down my left arm. I wondered where the bugs were coming from. Maybe the bed frame. Our handyman, Walt, had stored the frame on the back deck while he renovated our bedroom. Maybe spiders had crawled into the wood. Or maybe the chickens really did have mites and they really did bite people. Who knew? Not me.

A few days after Monica and Sophie returned from camp, I told Monica, “I’m getting bit in the bed at night.”

“I’m not,” she said. “How could you be getting bitten if I’m not?”

“Yeah well how could you not be getting bitten if I am?” I replied. “So let’s try an experiment: let’s switch sides of the bed and see what happens.”

“But I like my side of the bed,” she said.

“Humor me. Do the experiment.”

“OK.”

The first night nothing bit either of us. The second night I got bit again, and Monica did not.

“Look at that. Look at these bites on my arms and on my neck.”

“There aren’t that many,” she said.

And there weren’t, really. They only happened while I slept and they only itched in the morning.
But as the weeks passed, I got more and more bites. By a month after camp, I got bitten every night, just as I fell asleep. It felt like I was being stuck with a pin, often in my feet. If that happens enough, you begin to fear sleep.

“How are we going to get rid of this?” I asked Monica.

“They’ll get tired of us. And then they’ll go away,” she said.

I did not put much stock in the bored arthropod solution. It did not sound like bug behavior.

And why could we not see whatever was biting? I began to read up on mites, just in case. I learned that there are five developmental stages of bird mites: egg, larva, protonymph, deutonymph, and adult. Unless they have fed, the adults are under 1 mm long, translucent, and are as difficult to see as a tiny piece of clear tape. Earlier stages are even smaller and require magnification; they cannot be seen with the unaided human eye. (Source: Penn State Entomological Notes, Stephen B. Jacobs, 2010).

How strange that something so annoying was invisible.

I began reading on the Internet about getting rid of mites. Various people had put up information. It sounded as if mites hid in people’s clothes, so laundry-washing protocol was a big topic. Isolate your clothing after wear, the articles said. Once you have worn them, your clothes are fomites, objects that can transmit infestation, until you wash them in hot water, ammonia and Borax. We began to handle our clothing that way, even clothing worn by Monica and Sophie, who were not bitten much at all.

I, on the other hand, was bitten often and was more and more uncomfortable.

“Doesn’t this bother you?” I asked Monica.

“Sure it bothers me. It just doesn’t bother me the way it bothers you,” she said. “I don’t let it get to me, not the way you do.”

“We could, you know, get rid of the chickens,” I said.

“Why?” said Monica. “We’ve had rodents, on and off, ever since we bought this house. They’re probably the source of whatever is biting you. We need to figure out what’s causing this, not run off and do a bunch of things that make no sense.”
I complained every day. I thought Monica was not listening. But she must have talked with her friends, because somebody told Monica about the county vector control department. She convinced Vector Control to send an inspector named Stan. He was a big man who wore thick rubber boots and declined to sit down in the house. Smart move.

I told Stan what we were dealing with and he said, “When people are being bitten by things they can’t see, it is almost always mites.” He took a tour, starting in the back yard and ending at the front of the house. Although the basement was hard to rodent-proof, he skipped it because he did not fit through the narrow trap door and down the ladder.

In the back yard he stood near the chicken coop and said, “Keep a pair of shoes by your back door, just to wear when you go outside. If your chickens have mites, you don’t want to track them into the house.” Then he came in, stood in the living room and turned a slow circle, taking in the wood paneling, the high beamed ceiling, the fifteen-year accumulation of toys and books and paper. And he laughed. “You have mite heaven here,” he said. “They love hiding in the crevices of wood paneling. They love it when people collect lots of stuff. I hope you have deep pockets, because this is going to cost you.”

We walked into the laundry room. There was a line of clean, big trashcans against one wall. “You keep your laundry in plastic garbage bins?” he asked.

“Yes,” I said. “This is our new protocol. We isolate the dirty laundry until we can wash it with detergent, ammonia, and Borax. And of course we mop the floors every day with orange cleaner.”

“Get a pest control company,” he said. “Don’t go crazy with the cleaning.”

I had been reading on the Internet that mites were specific to feeding on one species, and I asked Stan about it. “No,” he said, “Mites are not fussy. They will feed on anything with blood.”

Then he spent twenty minutes telling me stories. How he once picked out the red dot of a well-fed mite on a white wall, from a distance, with his naked eye. He went on to tell me how
many people he had helped, how much good he had done. He left behind glue traps, which are just little squares of flypaper.

“I’ll be back in a week to pick these up,” he said.

And then he told me he was off to visit somebody just two blocks up the hill, a woman who was being bitten by something she could not see.

“So close! Are mites that common?” I asked him.

“You have no idea,” he said.

The next day there were tiny specks on the glue traps near the bed. The bed in which I seldom slept because I got eaten alive. I called up Stan, excited, and asked him to come back.

“Are you sure you want me to pick those up?” he asked. “It hasn’t been that long.”

I was sure. And I was wrong.

He picked up the traps, as I had asked. The next day he called. “There was nothing on those traps except psocids, which eat paper, not blood. So now that you’ve had a negative result, there is nothing more I can do for you. I recommend you hire a pest control company.”

“What do you mean, there is nothing more you can do? I’m getting bitten all night by these things,” I said.

“I have no proof of that,” he said.

“There was a red dot on one of the glue traps—just like the story you told me about finding the red mite on the white wall!”

“The guy who read your traps is a biology student, and he saw nothing useful.”

No data. It became my mantra: The problem was that there was no data.

And there had to be something better than glue boards. Why would mites climb onto a glue board? What was in it for them?

I talked with my friend John at work. He told me he used to have moths at his house until he ordered moth pheromone traps on the Internet. We looked it up: No mite pheromone traps on the internet. John said we could get rich inventing them. He said he would call Ohio State, where they have a big mite symposium every summer. Those mite scientists had to be using something
better than sticky cardboard. We decided to talk the next week. We never did.

Some website said diatomaceous earth would kill mites, so one day I bought a tub of it. That night I set up an air mattress in the living room, on top of hardwood floor, not carpet. I put clean blankets on top and surrounded the mattress with diatomaceous earth. I figured I was safe for a night. I lay down and Sophie lay down next to me. She liked this game. It took about a minute before bugs were crawling all over me, on my legs and my torso, in my hair. I stood up.

“What’s wrong, Mama?” asked Sophie.

There had to be some way to stop them.
CHAPTER TWO

The Birdmite Site

Not long after the visit from the Vector Control guy, I ran across the Birdmites website. This site for mite sufferers was very different in 2009 than it is now. Back then it was run by a guy who had had mites for years with no success in getting rid of them. He documented his misery in detail, including all the things he tried that did no good. He had pictures of mites under his fingernails, and fungus growing on his toes that he said was caused by mites. He had little essays about mites in his sinus cavities, mites in the mucus in his lungs, and mites crawling around on his eyes. The most positive part of his message was about the adaptations he had made so he could minimize the stress of life with mites. For example, because bird mites are nocturnal, and he was awake anyway while they crawled in and out of his pores and bit him all night, the guy had gotten a night job. Every morning after work, when the sun came up and most of the mites went to sleep, he took a nap in his backyard on one of those plastic web reclining lawn chairs, so there was no fuzzy upholstery for the bugs to hide in. When he rose from his nap, he cleaned the lawn chair with ammonia to kill the bugs he had shed. Naturally, every time he drove his car he sat on plastic garbage bags, because his car upholstery was infested. And he took along one of those sticky plastic roller things designed to take lint off clothes, so he could collect mites off his skin with one hand while he steered the car with the other. He
ironed all his clothes, even his underwear. He spent his life fighting mites but never got rid of them.

And this was the most thorough, best information I had found anywhere.

The whole thing was hard to believe. But what I was feeling, more and more every day, was equally hard to believe.

On that same website was a forum where people with mites wrote in to tell their stories. I read about a future I did not want. These bugs did not get sick of people, as Monica wished. On the contrary: they set up housekeeping and staked a claim, right there in your skin. People wrote about what it was like to live with parasitic mites, year after year.

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I read the post of a single mother who had battled mites for two years. Even when a sample was found on her skin in the ER, the lab report came back “Non-Human Parasite” and was reported as “Not a Parasite.” The woman was treated for scabies, which was totally ineffective, and sent home each time still infested. Finally she was in the ER with a doctor when a mite moved inside her nose, and she was able to direct the doctor just where to find and remove it. The doctor identified it as a bird mite. At that point she began to get the treatment she needed. Then her teenage daughter became infested and was completely terrified after watching her mother’s battle with the medical system. The mom wrote that people in the medical field need to be re-educated about parasites.

Indeed. How could someone with a medical condition be denied treatment because medical personnel believed the condition was not possible? I could imagine one doctor being that poorly informed, but how could they all be in agreement and all be so wrong? Would a doctor ever say to a person allergic to dust mites, “Sorry, we can’t see your dust mites, so you must not have them?” I was righteously indignant for those poor souls.

But then I wondered: Could I get that kind of brush-off from a doctor? Could my child? I would have to navigate the healthcare system carefully.
On that same website, I read a post by a man who had had mites for three years that he believed came from an ongoing rat problem. He had mites in his nose, his eyes were bloodshot and sticky. His house was old and leaky, and he saw no way to get rid of either rats or mites. Everyone in his life thought he was crazy, and he wished he were merely crazy, not infested. He told his fellow parasite hosts to stay strong.

Stay strong. Encouraging words were great, even from an anonymous stranger. I told myself they were just bugs, and they had to make a living. Just like a steer might see me as a parasite when I had a perfectly nice lawn to chew, and yet I wanted steak. I told myself it was nothing personal. But when a parasite loves your particular scent, it’s too personal not to take personally.

Then I read a post by someone who had sold her car, moved out of her house, washed all her clothes in ammonia and bathed alternately with bleach, salt, and hydrogen peroxide. This person was starting to feel better, and was almost afraid to hope it was all working. She wrote that she had wanted to kill herself, and only held back because of her mother and her dog.

What desperate things people are willing to do when life becomes unbearable. I just hoped this poor woman knew never to mix ammonia and bleach, because the combination releases toxic fumes like chloramine and hydrazine.

My quality of life was sufficiently affected that I could imagine giving up everything just to be rid of the bugs. In fact, the only person on the Birdmites website who claimed to have beaten the bug had walked away from everything he owned. He was wealthy enough and motivated enough that he could leave behind his house, his car, his clothes, and every single possession. He went from hotel to hotel, night after night, scrubbing himself, and hired people to bring him new clothes every day. When his skin was finally free of mites, he started over in a new home with everything new. This was a single man. He had money, and he was ready to do whatever was necessary to take care of himself. I could learn from him but I was in no position to do what he did.
I would have to parlay my training as a biologist, combined with middle-class resources, into some new solution.

Another comment in the forum focused on how uninformed the medical and entomology professions seemed to be about this problem. One entomologist told this mite survivor that he must have a different problem altogether when his symptoms continued after removing bird nests from his home. The entomologist told him the mites should be gone. *Should* be gone? By what measure? The condition is invisible, there is no diagnostic test, and the experience of the person with mites is dismissed. A fixed theory of how mites behave seemed more persuasive to medical and pest professionals than the natural history of mites on humans. Incredible. How did we get here? I was heartbroken for the people on the forum, and terrified for us.

“Our lives are over,” I told Monica, the morning after I sat up all night reading this stuff.

“Aren’t you being a tad melodramatic?” she asked. “You have such an imagination, and you always see the worst side of everything. Stop catastrophizing.”

“This is a catastrophe. Why not catastrophize? Here, read this,” I said, and tried to show her the Birdmites website. She refused to read it. But as days and nights went by, I kept reading and learning from many sources, from agricultural bulletins to mite textbooks. As my evenings transformed from restful sleep to a nightly vigil of crawling and biting, the tiny silver lining was that I had time to learn a lot.

It is no surprise that I had completed a Masters in biology without learning the first thing about mites. People ignore them. Mites are small, period. In fact, the period at the end of this sentence would make a nice living room for a mite.

With bacteria, you can take a swab and grow a visible colony on a petri dish. At the other end of the scale, if you have bedbugs, you can see the damned things with your naked eye. But mites occupy a tenuous middle ground: too small to see, too few and too mobile to culture. Given current diagnostic tools, mites have the stealth of guerrilla fighters. And mites are fast: a 2014
study of *Paratarsotomus macropalpis*, a Southern California mite, shows it is the fastest animal on land when speed is measured by body lengths per second.

Mites are everywhere. To mites, a vertebrate like you or me is an entire ecosystem. Pyroglyphid mites feed on the cast-off skin cells in your sheets. *Demodex* mites live in the hair follicles and glands of your face, eating your secretions and interstitial fluid. The unlucky human who encounters Sarcoptes mites will find tunnels and blisters in the webbing between their fingers, where these scabies congregate and dig away. In the words of arthropod expert W.B. Nutting, “We can look on the mammal as a wandering Galapagos archipelago with each island (e.g., an eyelid) having several different habitats.”

Mites live on, and in, many kinds of animals: in the throats of honeybees, in the ears of moths, in the nostrils of hummingbirds, in the lungs of seals. They live in the vaginal mucosa of turtles and the eyeballs of bats. We call parasitic mites “ectoparasites,” meaning they live on the outside of the body; but mites live where they live, without regard for our words.

Many mites live in soil, their original home. There are even mite species that have made themselves at home in water. We have mites in our food. There are mites that love the grain we store in our larders.

Of the two million species of animals, plants, and other living things on Earth, we proud vertebrates number less than 60,000 species, only five thousand of them fellow mammals. There are sundry invertebrates: a hundred thousand species of mollusks, fifty thousand of crustaceans. But more than half the species on the planet are arthropods, a group that includes insects (a million species) and arachnids. The arachnids number 100,000 species each of spiders and scorpions, plus the acari: a handful of tick species and *a million species of mites*—half the species on the planet. From the point of view of an alien biologist surveying our planet, blessed are the mites, for they have inherited the Earth.

Given how many mites there are, if they were bigger, if we could see them on our skin and in our food, we would make
it our business to know more about our acarine neighbors. We
would know mites’ sexual idiosyncrasies. There are mite species
where a male captures several immature females and carries
them around on special appendages until the females are mature
enough to breed. There are mite species where the females are
impregnated before they are born. There are mite species where
a female, once fertilized, carries the sperm for life and impreg-
nates herself at will. There are mite species where the male gen-
erates a sperm sac that includes a symbiotic fungus, and the sac
seeks out the female and explodes inside her genitalia.

We would know what mites look like: No head, no eyes, lots
of legs, lots of stages of development, from egg, to several nymph
stages, to adult.

We would know what mites love: The undisturbed nest, the
warmth and moisture of a host, and hair, lots of hair, to hide in.

We would know how resilient mites are: that they withstand
big swings in temperature and humidity, that they quickly evolve
around pesticides, that they were here long before we were and
will likely be here when we are gone. We would know they can
reproduce—from egg to adult—in about a week, and yet can be
dormant for nine months or more.

They are resilient, yes, but surely they have weaknesses. If we
saw mites, if we acknowledged their presence, we would want to
know all about their weaknesses.

The more I learned about mites, the more my views as a
biologist differed from the views of my spouse the psychologist.
Standing by the bed one morning, Monica rubbed her nose, and
then blew it. “Piece of dust crawled up my nose,” she said.
“I didn’t know dust could crawl.”
“I know what you’re thinking: That a mite went up my nose.
But there are no ectoparasites that become endoparasites, no
outside parasites that go inside. I never heard of such a thing.”

Just because Monica never heard of a biological event
didn’t make it impossible. After dinner that night, I showed her
a journal article from China comparing two assays that detect
mite antibodies in human feces. Scientists in China were seeing
enough mites as endoparasites—parasites inside the body—to make it worthwhile to develop and compare two diagnostic tests.

“Where did you get this?” Monica asked, flipping the pages.

“I printed it off the internet. It’s an article from a peer-reviewed scientific journal.”

“You can’t believe anything you read on the Internet,” she said, tossing it down.

It is amazing what we humans can will ourselves to deny.

Around that time both Monica and I noticed that our new bites were not as inflamed as the earlier bites had been.

“What are they doing?” I asked. “Can they affect our immune system to stop the reaction?”

Monica shrugged. She was not a biologist, and didn’t care about that stuff. But I didn’t want the mites to be better guests. I didn’t ever want to come to terms with them.

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For the moment, I just had to keep going. After all, it was time to celebrate my birthday. It was September 2009, and I was about to turn 56.

Our house was a great place to throw a party. Big rustic brown shingle, nice back deck shaded by a huge oak. My grown daughter Bella was there, and of course our little Sophie. And then Sophie’s friend Kristina’s mom, Arlene, showed up uninvited with her trademark water bottle full of vodka. She laughed her barky laugh and told endless stories about her construction business. Monica made my favorite: chocolate cake with that cooked white icing that tastes like melted marshmallows. I even ate some. The mites had not yet destroyed my appetite.

But within weeks of my birthday, I was nauseous most of the time. I knew that when a bug bites, whether it’s a flea or a mosquito, it leaves behind a little protein in its saliva. A lot of bugs were biting me—enough, I figured, that their residue could make me sick. I remember going with Monica and Sophie to Monica’s favorite veggie Chinese restaurant. I sat with them but could not eat a bite. They were amused by how much food we took home.
Sophie was an October baby, so her tenth birthday was the next time for a party. By then it was clear the bugs were reproducing at an increasing rate. There were enough mites in the house that even Monica and Sophie were bitten sometimes. To protect Sophie’s friends, any one of whom might be susceptible the way I was, I insisted we hold Sophie’s party offsite. And so we drove the kids to Sophie’s godmothers’ house and cooked a barbeque.

We drove home after dark, when parasitic mites are out full force like all good vampires. On the way home, I half expected one of the kids to get bitten in the car—since the bugs were starting to hide in the upholstery and carpeting—but it didn’t happen.

So our daughter turned ten, and we maintained the appearance of a typical Lesbian family. For the moment.