

A Talk with Sandra Steingraber

Author of *Raising Elijah*

You're an ecologist and a mother. Why did you decide to marry the two to write *Raising Elijah*?

Because the book is about a serious topic, I wanted a playful narrative structure. I thought it would be fun for readers to follow an ecologist, who once chronicled interspecies relationships in rainforest habitats, as she explores the habitat of her own household with two children—from the timing of labor contractions to the arrival of puberty, from the origin of food preferences to the environmental influences on brain development.

Field biology turns out to be good preparation for motherhood. Every day is different. Variables are multiple, hypotheses dashed, experiments non-replicable. You have to pay attention all the time. You're awake in the middle of the night. And then, just when you think you might have the whole mystery figured out, everything changes. It's humbling.

What were some of your discoveries?

When my three-year-old climbed to the top of a tree and began sawing off limbs with a tool he had spirited from his father's collection of hand saws, I discovered that I still knew how to move quickly yet soundlessly so as not to frighten or distract the object of my observation upon approach. That's a skill I brought from field work.

When our television set was stolen, my husband and I discovered that it's actually more convenient to raise kids without screens. Of any kind.

With the help of local farmers and a Crock-Pot, I discovered that I can cook for my family 365 days of the year, even though I work full time and travel 100 days of the year.

I think I utterly failed on the bedtime front, but readers can decide for themselves.

Along the way, I reveal that the private, isolating world of parenting is profoundly connected to the public world of policymaking. In this way, *Raising Elijah* is both a memoir of a scientist mom and an exploration of the environmental threats to childhood.

What kind of threats?

Because of their rapid growth, children are more ecological than their parents. Pound for pound, children breathe more air, drink more water, eat more food. Their bodies are literally assembled from the environments they inhabit. Every minute, the whole ecological world is streaming through them and becoming them. This means that our children are also exposed to more toxic chemicals, pound for pound, than are we adults: mercury from coal, hydrocarbons from car exhaust, arsenic from pressure-treated play structures, pesticides in fruit, hormone-disrupting chemicals in plastics.

Is there hard evidence that these exposures are making children sick?

We know with certainty that lead, mercury, and PCBs interfere with the migration of fetal neurons in ways that extinguish IQ. We know for a fact that arsenic is a carcinogen and a neurodevelopmental poison. Exposure to air pollution during pregnancy is consistently linked to preterm birth, which itself raises the risk of a learning disability. Exposure to certain plastics is linked to asthma. Hormone-disrupting chemicals are likely playing a role in early puberty in girls. They are also linked to reproductive anomalies in boys.

For other disorders, the evidence is just coming in. Exposure to chemical agents in early pregnancy is one of several suspected contributors to autism, for example.

In general, toxic exposures cause more damage in children than in adults because, in early life, toxic exposures can alter pathways of development. Children who grow up near busy roads grow smaller lungs than children living in communities with cleaner air.

How much evidence for harm do you want before demanding precautionary action to protect a child? That's a central question of the book.

You say that the environmental crisis is actually two crises. Could you explain that?

I see the environmental crisis as a tree with two main branches. One branch represents what is happening to the planet through the accumulation of heat-trapping gases, and the other branch represents what is happening to *us* through the accumulation of toxic pollutants in our bodies. The trunk of this tree is an economic dependency on fossil fuels. When we light them on fire, we damage the global ecosystem. When we use them as feedstocks for making petrochemicals, we create substances that tinker with our subcellular machinery and the signaling pathways that make it run.

Public policy should safeguard the healthy development of children and sustain the planetary life support systems on which their lives depend. This necessitates a new approach to chemical regulation.

How, in a time of budgetary shortfall, can you call for more regulations?

Chronic childhood diseases linked to toxic chemical exposures are rising in prevalence. This is not only an ethical problem; it's a very expensive problem.

Premature birth, which now affects 1 in 8 U.S. children, carries a collective \$26 billion per year price tag. Asthma, which now affects 1 in 11 children, costs \$18 billion a year. Learning disabilities now afflict ten percent of children, as does attention deficit/hyperactivity disorder. All together, special educational services consume nearly a quarter of U.S. school spending. Autism costs the nation \$35 billion a year. While

environmental factors are not the only cause of these various problems, they are unquestionably contributing to them, and they are preventable.

Your book makes chemical pollutants seem like a problem for mothers. Why not also for fathers and everyone else?

What I say is that the environmental crisis is, ultimately, a crisis of family life. To make my case, I weave the evidence into an autobiographical tale, and, as a result, the voice of this book is a mother's voice. But I'm talking to all parents, mothers and fathers alike.

As I see it, our two fundamental responsibilities as parents are to keep our children safe and to provide for their future. The trespass of toxic chemicals into the bodies of our children is undermining our ability to carry out our first duty. And climate change—which is ushering in mass extinctions and erratic weather—is stealing the second.

Tell us about the book's title. Elijah is the name of your son?

It is. And it's also the name of one of my childhood heroes, the abolitionist Elijah Lovejoy, who was assassinated in 1837. Although he knew his life was in danger, he kept speaking out against what he saw as the most pressing moral crisis of his time: the nation's economic dependency on slave labor.

What fascinates me is that Elijah was the father of a young child with another on the way. He had family responsibilities—and yet he couldn't remain silent. I feel that way, too.

I believe that we parents of young children today need to raise the uncompromising spirit of Elijah Lovejoy for the great moral crisis of our own age. I call for a new abolitionism directed toward ending our economic dependency on fossil fuels.

At the same time, I'm literally raising Elijah, my nine-year-old son, and the book focuses on my relationship with him at this particular moment in human history.

A few years back, Elijah wanted to be a polar bear for Halloween. So I sewed him a costume. But it was with the knowledge that it would very likely outlast the species. The streets of our village were filled that year with children dressed as butterflies, bumblebees, bats, and penguins. These animals are all in trouble. I kept thinking, as we walked door to door, what will happen to these costumes if their real-life antecedents disappear? Will children dress up as vanished species? And have mothers of any other generation entertained such thoughts and borne such terrible knowledge?

Do you talk to your children about the issues in this book?

Have I told Elijah that, because of warming ocean temperatures, the world's plankton stocks have declined by 40 percent in the last 50 years? No. Have I mentioned to him that oceanic plankton provide us half of the oxygen we breathe? Yes.

There's a whole chapter in *Raising Elijah* about how to talk to children about climate change, which is trickier than conversing about sex. But, really, the goal is not to figure out how to put together the perfect Big Talk on Planetary Calamity. The goal is to rise up and do something about it so that our kids can see that we're fighting on their behalf. Our good actions, not explications of the problem, are what reassure kids.

So, what are parents supposed to do? Air dry the laundry? Mow the grass by hand? Argue with the school about what cleaners they use? All this after a day's work, a commute, a parent-teacher conference, and soccer practice? I mean, let's get real.

Okay, I do advocate for push mowers and clotheslines. But it turns out these things actually *save* both time and money. From a systems point of view, they are more convenient than their fossil fuel-consuming counterparts. A push mower can be used any time day or night, including naptime. It doesn't fill your garage with carcinogenic fumes or create smog, and it doubles as an exercise machine. If you tricked out a push mower with a heart rate monitor and stuck it in a gym, people would pay money to use it.

Look, I'm not interested in cajoling busy parents into unpleasant acts of self-sacrifice. In fact, I see that approach as part of the problem. Psychologists even have a name for the helplessness we feel in the face of knowledge about a public problem that lacks a meaningful public response: *well-informed futility*.

Are you saying that the goal of a “toxic-free home” is just a pipe dream?

I'm saying that protecting children from dangerous chemicals should be on the national agenda, not left up to individual families. You can't fill the world with brain poisons and then ask parents to police the results. I am a conscientious parent. I am not a HEPA filter.

A green home is a beautiful thing. But it can only exist within a green world—one with clean air, pure water, and some pollinators. It's not a bomb shelter.

There has been a lot in the news about hydrofracking recently. For those who don't know, what is it? And what are your thoughts about it?

Hydrofracking does to shale bedrock what mountaintop removal does to an Appalachian mountain: blows it up to get at a carbon-rich fossil fuel trapped inside. In the case of fracking, the quarry is not coal but methane bubbles—so called natural gas—trapped inside layers of shale a mile below the earth's surface.

The topic of the book's final chapter, hydrofracking is the single largest environmental threat to children's health. It's inherently leaky and relies on chemicals linked to preterm birth, asthma, cancer, and learning disabilities. It industrializes farmland and fills rural roads with tanker trucks hauling toxic materials. It degrades air. It poisons water.

As a science writer, I'm interested making visible for my readers the shale bedrock of our nation—which was once a shallow sea. Those bubbles of methane represent the bodies of once-living creatures: sea lilies and squids. This shale graveyard also contains radioactivity, heavy metals, and brine. It's a place that we can't see, and yet we are all invested in the integrity of the bedrock we walk over each day. Children get this.

What is the most important thing that parents can do after reading *Raising Elijah*?

Flip immediately to the “Further Resources” section in the back, which contains an annotated list of groups that are already engaged in smart, creative solutions, from green chemistry and green architecture to efforts to redesign the National School Lunch Program and reform our nation's famously useless toxic chemicals screening program. Just scanning through this list gives me hope because all these organizations are led by other parents, who are already hard at work. We don't need to reinvent the wheel.

This is your third book on environmental health. All three blend science writing with first-person memoir. How is this book different from the others?

From a writerly point of view, *Raising Elijah* is the first book I've written in the past tense. That feels like a big point of departure for me, a person who is drawn to the diaristic immediacy of present tense for narrative non-fiction. But *Raising Elijah* takes place over a long period of time—nearly a decade. I discovered that composing in the past tense offered me more flexibility to move through time and provide commentary on the action. The past tense is a roomier house. And we are a messy family.

More than my other two titles, this book is driven by storytelling and, of the three, I think that it's my funniest book. If so, that's all Elijah's doing. He's a very funny child, who values laughter above all else.

That being said, *Raising Elijah* is just as research-intense as *Living Downstream* and *Having Faith*. I simply shoved more of the technical details into the endnotes. And, I hope, it's just as lyrical. I'm always trying to find a language that is as lovely as the biological systems I'm describing and that will keep readers turning the pages.

I have to ask: any recipes?

There is a recipe!—for cheese pizza, my children's favorite food. It's part of a chapter in which I trace the origins of all the ingredients in a slice of pizza—from garlic to olive oil—back to the farm in an attempt to answer two questions: Why is organic food more expensive than food grown with petrochemicals? And can I make a pizza from organic ingredients, mostly purchased from local farms, that costs me less than one assembled from ingredients sourced from the supermarket?

The answer to the second question is *yes*.