

SLOW DEATH
BY RUBBER DUCK

THE SECRET DANGER
OF EVERYDAY THINGS

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P R E F A C E



IN *SLOW DEATH* by *Rubber Duck*, we argue that there is no separation between environmental issues and health issues. In fact, we even go so far as to say that the health of children is perhaps the most urgent environmental issue facing the United States—and the world—today. Our research conducted for this book, and the research of hundreds of medical scientists, confirms that children are most at risk to the many serious ailments linked to toxic chemicals. We refer to them as the modern childhood epidemics: asthma, autism, attention deficit hyperactivity disorder (ADHD), obesity, and reproductive disorders, among others. What is even scarier is that exposure to certain chemicals in childhood is now linked to the onset of neurological disease later in life, diseases such as Parkinson's and Alzheimer's. So the two most vulnerable populations, the young and the old, are being hurt most. And this does not even include the disease that is typically associated with toxic chemicals, cancer. According to the American Cancer Society, 1.5 million new cases of cancer are expected to be diagnosed in 2009.¹ This is truly scary stuff, and not only is it disturbing from a human health perspective, but also it places untold costs—mental and financial—on families, the medical system, and

the American economy. Billions of dollars a year in medical bills can be attributed to the health effects caused by exposure to chemicals. For example, a national study estimated the environmentally attributable costs of selected illnesses and disabilities in American children at nearly \$55 billion in 2002.² And this estimate was conservative: it did not consider the full range of illnesses and disabilities for which there is now considerable evidence of environmental causes. A California study pegged the annual costs of illness due to toxic chemical exposure to be nearly \$9.5 billion.³ New data, moreover, now implicate some environmental contaminants as causal agents in the global epidemics of type 2 diabetes and obesity. Were the portion of the costs of these diseases that may be due to contaminants included in the calculation, these estimates would be much larger.

This link between pollution and human health is a relatively new phenomenon. In fact, working on the health effects of toxic substances as recently as the early 1990s was not easy. The evidence was not well established, the medical community was sceptical at best, environmental standards focused on smoke stacks and toxic waste pipes, and chemical companies had the upper hand. Even environmental organizations suggested it was a bad idea to try to link environmental issues with health issues; “we’d lose our focus and alienate our members,” said some environmentalists. But a group of smart and dedicated people were clearly on to something. The turning point for one of us (Bruce) was being invited to a dinner at a swell Washington, D.C., restaurant in February of 1995. Dr. Lynn Goldman, then EPA Special Advisor on Children’s Health was the invited speaker, and she described how children are most at risk to the effects of toxic chemicals in our food, water, and air. They consume more on a body weight basis than do adults, they breathe more rapidly and therefore inhale more potentially polluted air, they crawl around poking in dusty corners and stick everything they find in their mouths. But these activities simply explain how kids have greater levels of exposure.

The most critical issues facing babies and children are that their developing bodies and brains cannot tolerate chemicals in the same way that adults can.

This dinner meeting convinced Bruce of the need to continue learning more and spreading the word. As a result he started a foundation-funding program called Environmental Contaminants and Children's Health. The program ran for nearly ten years and helped create dozens of organizations and initiatives that continue today, linking doctors, health professionals, researchers, women's health advocates, environmental groups, parenting organizations, and others, all of them working to educate people and reduce the use of toxic chemicals.

Thankfully, and in large part due to the work of the people that assembled in that Washington restaurant in 1995, it is now increasingly commonplace for Americans to be aware of chemicals they use in their homes and gardens, and there is growing public notoriety for the nasty chemicals that hide in toys, baby bottles, kids' pajamas, popcorn bags, mattresses, and thousands of other products we assume to be safe. Oprah's magazine *O* has covered toxins in everyday consumer products and even the Bisphenol A controversy in plastic baby bottles.⁴ Heck, if both Oprah and Pat Robertson are talking about toxic chemicals, then we know they have arrived as an issue of major concern for Americans.⁵ Manufactured synthetic chemicals are harming babies in a big way. It's as simple as that. Who in the world—other than the powerful vested interests that make money from these poorly made products—can defend this sorry state of affairs?

After World War II, the American economy boomed—oil, cars, planes, space travel, computers, and plastics. What is the common thread that ties so much of American progress together, making our world convenient yet toxic? Petrochemicals, the mainstay of plastics. The war brought incredible advances to the chemical industry, and the United States became the dominant global player in petrochemical-based plastics. "There's a great future in

plastics,” Dustin Hoffman’s character was told in *The Graduate*—unless you are exposed to them in the womb, he failed to mention.

In 2007, the most recent year of data reported by the US EPA, 4.1 billion pounds of toxic chemicals were disposed of or released into the American environment. These are the amounts reported for almost 650 toxic chemicals monitored by the US EPA’s Toxic Release Inventory (TRI).⁶ The TRI database contains a wealth of information on toxic chemical releases at thousands of private and federal industrial facilities nationwide. To put this in context, this huge number refers only to the chemicals that are released into the environment in a year, ten times that quantity of chemicals, or 42 billion pounds, are produced in, or brought to, the United States *each day*.⁷ These are the chemicals that wind up being used in the vast array of consumer and household products we purchase, as well as in a multitude of industrial processes.

The opening line of our book says that it is “downright hopeful,” and events following the book’s publication are proving this to be true. The hopefulness, however, follows a period of stagnation in the United States where the Toxic Substances Control Act, the 1976 law that gives the EPA the authority to regulate chemicals, is considered by health and environmental experts to be a legislative failure; the chemical industry on the other hand considers it to be model legislation. Kind of like a model car, one supposes. Looks nice but doesn’t actually function.

All this is changing. Sophisticated organizations such as the Natural Resources Defense Council (NRDC), which monitors health and safety laws in the US, describes the “near collapse of regulatory function” for toxic chemicals.⁸ The Obama administration has signalled a need to reform chemical safety laws, and with the proverbial writing on the wall, the chemical industry has come out supporting “Congress’ effort to modernize our nation’s chemical management system” with Ten Principles to help guide Congress.⁹ Even Dow Chemical, in a backhanded way, is admitting that TSCA is not working. Dow has recently called for “enhanced

regulation” with a “result that that restores public confidence” in chemicals management. Time will tell whether this seemingly new tune being whistled by the chemical industry marks a true change of heart or more of the same creative stonewalling that has characterized the industry’s approach to date.

Here are a few more fascinating numbers. There are 82,000 chemicals in use in the United States with 700 new ones added each year. Of these 82,000 some odd, only 650 are monitored through TRI, only 200 have ever been tested for toxicity, and *only five* have been banned under the Toxic Substances Control Act. Not even asbestos is banned, a known carcinogen that has killed nearly 45,000 Americans over the past 30 years.¹⁰ And finally, seven is the number dearest to our hearts, for that is the number of chemicals we write about in our book.

I suppose what captures people’s attention is not only that we write about these seven chemicals, but that we expose ourselves to everyday products that contain the chemicals. And more importantly, we measure the levels as they increase in our blood and urine. The results are truly significant. But thankfully, so is the speed at which public concern is mounting and corporate and government action is starting to take place. So much of this action centers in the United States.

For keen observers of all things American, it was clear that the stories in the book would feature American companies, products, towns, scientists, and community activists. So this is a book as much about American culture as it is about anything else, and perhaps even more so about the fascinating contradictions and juxtapositions inherent in American culture. The culture of success but over-consumption, the culture of abundance but obesity, the culture fuelled by petroleum but opposed (until recently) to global warming standards, and the culture of toxic chemicals but now an emerging field of green chemistry.

Americans play the dual role of having created the toxic soup in which we bathe daily, and also of getting us out of this mess

through a combination of scientific ingenuity, entrepreneurial spirit, and the diligent work of citizens, mothers, nurses, and doctors across the country. The green chemistry revolution, for example, holds huge promise. Many companies are now moving to make stuff in a non-toxic way and the Presidential Green Chemistry Challenge—an award for outstanding green chemistry technologies presented by the EPA annually—has recently recognized corporate achievements as varied as new lubricants and adhesives made out of Vitamin C instead of the current hazardous ingredients and a really promising office equipment toner made from soy instead of nasty petrochemicals.

There is also the emerging field of biomimicry where rather than creating synthetic chemicals with certain properties we desire, scientists mimic the much more elegant methods of Mother Nature to create sleek designs, water resistant properties, strong fibres, or techniques for capturing drinking water from mountain mist.

American industry is discovering that not only is there a major downside to being seen to defend toxic ingredients (witness the market share that major manufacturers of baby bottles lost as a result of being caught offside the past year's consumer backlash against bisphenol A) but that there's real money to be made in "green." Walmart's "Smart Products Initiative," in which its suppliers are being pushed to move toward non-toxic ingredients, and Clorox's new Green Works product line are just two such major corporate public relations and financial successes.

In many ways, this new and exciting public concern with toxic chemicals in consumer products is the flip side of the global warming coin. Where global warming is a huge problem necessitating ecosystem-level solutions, the clean up of toxic chemicals begins at home. The sources of our pollution are readily identifiable, and they are often innocuous household icons such as rubber ducks and baby bottles. We try in this book, with our self-experimentation, to tell the story of this very personal kind of

pollution in an engaging way. We hope it builds on the rich tradition of our own pollution-fighting heroes and heroines who kicked back at corporate complacency and the nay saying status quo, allowing us to imagine a safer, toxin-free world for our children.

Bruce Lourie and Rick Smith

Toronto, Ontario

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INTRODUCTION



*The four building blocks of the universe are fire, water, gravel
and vinyl.*

—DAVE BARRY

THE BOOK THAT YOU'RE HOLDING is downright hopeful.

Now this may seem counterintuitive, given that the word “death” appears in the title and the book describes a great many toxic chemicals that are screwing up our bodies in myriad ways. There is that. And getting all Pollyanna-ish is certainly premature.

But things can change. Sometimes very quickly and for the better.

As we wrote this book, we had to run hard just to keep up, as governments the world over complicated our writing with a European ban on noxious flame-retardant chemicals in televisions, Canadian legislative changes to put the kibosh on toxic baby bottles and, after a prolonged drought, a new U.S. law (signed by George Bush, no less) restricting hormone-mimicking ingredients in the plastic of children's toys. That's a lot of action in six months.

And as we started to catch the first glimmers of our elected leaders getting their collective act together, many people began systematically purging their homes of suspect consumer products to make way for safer alternatives.

The tide has started to turn. With surging public awareness quickly pushing the issue of toxic chemicals up the societal priority

list, we set out to design something that would contribute, in some small way, to this awakening.

This is more than a book. It's kind of a big, unprecedented, adult science fair project. In the tradition of *Super Size Me* and Michael Moore, we investigated by doing. It's an unorthodox ("cuckoo," in the words of some of our loved ones) and very personal examination of the chemicals in our own bodies and the lives of our families. Along the way we've confronted the companies that made the chemicals, interviewed the government regulators who looked the other way while problems mounted and met the scientists and community organizers who are making a difference.

In our day jobs we're long-standing environmental advocates in Canada. We toil away in the trenches, trying to secure better government policy to protect the environment and human health. The idea for this book came out of that work, and specifically from Environmental Defence Canada's Toxic Nation project, a campaign to expose the dangers of pollution through testing Canadians for measurable levels of toxic chemicals in their bodies.

A New Kind of Pollution

Far from being the rock or island in the Simon and Garfunkel song, it turns out that the best metaphor to describe the human body is "sponge." We're permeable. We're absorbent. And Toxic Nation tries to measure the nasty things the human sponge has soaked up. Like efforts in the United States and Europe, the Toxic Nation project applies scientific testing techniques—previously restricted to the pages of obscure scientific journals—to the raging public debate about what pollutants we are exposed to, in what amounts and from which sources—and tells us what we can do about it. Since 2005 Environmental Defence Canada has tested the blood and urine of more than 40 Canadians for over 130 pollutants. People from all walks of life. Of all ages. Men, women and kids from different parts of the country and different ethnic backgrounds. They all turned out to be polluted to some degree.

As we chatted about the implications of these findings with the test volunteers, the media covering the story and the members of the public who took notice, it became clear that the whole concept of “pollution” that we carry around in our heads needed updating.

Belching smokestacks. Sewer outfalls. Car exhaust. For most people these are the first images that come to mind when the word “pollution” is mentioned. It’s still seen as an external concern. Something floating around in the air or in the nearest lake. Out there. Something that can still be avoided.

As our Toxic Nation testing makes clear, however, the reality is quite different. Pollution is now so pervasive that it’s become a marinade in which we all bathe every day. Pollution is actually inside us all. It’s seeped into our bodies. And in many cases, once in, it’s impossible to get out.

Baby bottles. Deodorants. A favourite overstuffed sofa. These items, so familiar and apparently harmless, are now sources of pollution at least as serious as the more industrial-grade varieties described above. The market-leading baby bottles in North America are made of polycarbonate plastic, and they leach bisphenol A, a known hormone disruptor, into their contents. Deodorants—and nearly every other common product in the bathroom—can contain phthalates (pronounced “tha-lates”), which have been linked to a number of serious reproductive problems. Phthalates are also a common ingredient of vinyl children’s toys. Sofas and other upholstered products contain brominated flame retardants and are coated with stain-repellent chemicals, both of which increase the risk of cancer and are absorbed by anyone sitting on a sofa or chair to watch Friday night TV.

We found all of these chemicals, and many more, in the bodies of the Canadians we tested.

The truth of the matter is that toxic chemicals are now found at low levels in countless applications, in everything from personal-care products and cooking pots and pans to electronics, furniture, clothing, building materials and children’s toys. They make

their way into our bodies through our food, air and water. From the moment we get up from a good night's sleep under wrinkle-resistant sheets (which are treated with the known carcinogen formaldehyde) to the time we go to bed at night after a snack of microwave popcorn (the interior of the bag being coated with an indestructible chemical that builds up in our bodies), pollution surrounds us.

Far from escaping it when we shut our front door at night, we've unwittingly welcomed these toxins into our homes in countless ways. In a particularly graphic example, it's been estimated that by the time the average woman grabs her morning coffee, she has applied 126 different chemicals in 12 different products to her face, body and hair.

And the result? Not surprisingly, a large and growing body of scientific research links exposure to toxic chemicals to many ailments that plague people, including several forms of cancer, reproductive problems and birth defects, respiratory illnesses such as asthma and neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD).

We have all become guinea pigs in a vast and uncontrolled experiment.

At this moment in history, the image conjured up by the word "pollution" is just as properly an innocent rubber duck as it is a giant smokestack. The first chapter of this book makes this case by giving a whirlwind history of pollution and examining how humanity's ability to poison itself has changed from a local, highly visible and acute phenomenon to a global, largely invisible and chronic threat. A threat very often coming from everyday household products.

Cause and Effect

Another insight that came to us through Toxic Nation is that once people realize they're immersed in pollution, it's a fine line between motivating them to action and having them lapse into a

kind of pollution nihilism. “If it’s all around us, there’s not much I can do, is there?” is a comment we heard frequently throughout the Toxic Nation project.

The need for specific answers was something that very much preoccupied the Toxic Nation test volunteers, regardless of whether it was Canada’s Minister of Health (one of a few politicians who let us draw their blood) or a ten-year-old kid from Montreal. The first question they all asked upon seeing their results was “How did this pollution get into me?” Talking in generalities about pathways of exposure (e.g., “This chemical is commonly found in plastics; this one is generally in upholstered products”) wasn’t enough to satisfy their curiosity. They wanted to know what act, on what day, had led to this level of pollutant in their blood. They wanted some assurance that if they started making different choices, such as buying more environmentally friendly personal-care products, they would see a decrease in their pollution levels. In short, they wanted an explanation of cause and effect that, in many cases, we were unable to provide because the studies hadn’t yet been done.

For example, we could tell them that researchers in Denmark have demonstrated that rubbing a laboratory preparation of phthalates over the entire body resulted in increased phthalates in the urine. But this doesn’t help much in the real world. Phthalate levels aren’t marked on shampoos or other off-the-shelf products. If you’re lucky the word “Fragrance” on the fine-print ingredient list is an occasional tip-off as to their presence. Would the normal use of name-brand personal-care products really affect someone’s phthalate levels?

“Probably” was the best answer we could muster.

For some chemicals, like bisphenol A (BPA), there are virtually no human data available at all. Nobody had ever tried to raise and lower BPA levels in a person’s body before. So telling people to stop microwaving their leftovers in polycarbonate containers because it would expose them to chemicals that leach out of the plastic felt just the tiniest bit wobbly in terms of certain outcomes.

As we talked about how to answer the questions outlined above, the germ of an idea started to take shape.

Only One Rule

“Why don’t we experiment on ourselves?”

What began as a joke, an offhand thought, quickly became a two-year megaproject. The more we chewed it over, the more doable it seemed. What better way to demonstrate, in concrete terms, the impact of daily life on the pollution load our bodies all carry than to deliberately ingest a whole bunch of these suspect substances and see whether they did, in fact, linger in our systems?

We set only one ironclad rule: Our efforts had to mimic real life. This may seem obvious, but it was actually a very useful guiding principle as we wrestled with the details of the experimentation. We couldn’t chug a bottle of mercury. We couldn’t douse ourselves in Teflon. Whatever activities we undertook had to be run-of-the-mill things that people do every day.

As we started consulting experts and poring over scientific studies, it frequently felt as if we were assembling a giant puzzle. The critical pieces that needed fitting together were a list of chemicals for which there was mounting human health concern, a good sense of daily activities that might expose the average person to these chemicals and the outline of an experiment that would reveal whether these daily activities measurably affect the levels of the chemical in question in our bodies.

We measured any increase or decrease in ourselves by methodically taking blood and urine samples before and after performing the activities. After considering many different options, we decided to take a look at seven toxic chemicals and divided up the chapters so we could tell the stories in the first person. This self-experimentation with dicey toxic chemicals, which so delighted our families (not!), was an experience best shared, we figured.

In Chapter 2 Rick experiments with phthalates and sets out to get some answers from the toy industry, which seems intent on

poisoning his kids. Bruce picks up the story in Chapter 3 by taking a trip to Parkersburg, West Virginia, the town that Teflon built, to see what happens when a company invents a chemical that lasts forever. In Chapter 4 Rick travels to Victoria, British Columbia, to speak with experts about the “*déjà vu* all over again” of brominated flame retardants, a family of compounds that seems to be repeating the nasty history of PCBs. Bruce, in Chapter 5, then gives a very personal account of mercury, the oldest known toxin. In Chapter 6 Rick successfully cranks his levels of the antibacterial chemical triclosan into the stratosphere and asks why we’re so terribly afraid of germs. In Chapter 7 Bruce confronts head-on the way in which the chemical industry continually asks us to assume risk so they can make more money. And in Chapter 8 Rick cooks with plastic and outlines how moms and dads are confronting the chemical industry when it comes to bisphenol A. Our über-organized project coordinator, Sarah, was the glue that held the whole effort together. She dealt with the complicated logistics of the experiments, blood and urine testing and communications with the laboratories. She assembled the masses of sometimes difficult-to-find research upon which the book is based.

The book concludes with a road map showing how simple changes in consumer choices can detox our lives and how the average citizen can help twist the arms of elected leaders so they’ll do better in protecting us from these toxins.

We won’t be surprised if this book annoys the pro-chemical industry, anti-environmental pundits who think or pretend (we’re not sure which is worse) that nothing in society should be regulated without absolute scientific certainty. These writers and lobbyists like to call our work and the work of any other scientists who identify health problems linked with synthetic chemicals “junk science.” The tests we carried out for the book follow standard science protocols and they’re easily replicable. Though they do not include large sample sizes, double-blind trials or other methods that constitute formal scientific research, what matters

is that they demonstrate the surprising reality that a couple of guys can manipulate the toxic substances in their bodies through the simple acts of eating and using everyday foods and products.

For readers wishing to understand some of the crazy ideas behind the proliferation of toxins around the world, we hope that this book will shed some new light on the issues. A light that is too often obscured by chemical companies and their batallions of hired-gun consultants, industry-funded academics and conflicted government bureaucrats.

As Rachel Carson wrote in *Silent Spring*: “For the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death.” That was 1962. Let’s see how we’re doing today.