

Rat Park

THE RADICAL ADDICTION EXPERIMENT

In the 1960s and 1970s scientists conducted research into the nature of addiction. With animal models, they tried to create and quantify craving, tolerance, and withdrawal. Some of the more bizarre experiments involved injecting an elephant with LSD using a dart gun, and pumping barbiturates directly into the stomachs of cats via an inserted catheter. With cocaine alone, over five hundred experiments are still performed every year, some on monkeys strapped into restraining chairs, others on rats, whose nervous system so closely resembles ours that they make, ostensibly, reasonable subjects for the study of addiction. Almost all animal addiction experiments have focused on, and concluded with, the notion that certain substances are irresistible, the proof being the animal's choice to self-administer the neurotoxin to the point of death. However, Bruce Alexander and coinvestigators Robert Coombs and Patricia Hadaway, in 1981, decided to challenge the central premise of addiction as illustrated by classic animal experiments. Their hypothesis: strapping a monkey into a seat for days on end, and giving it a button to push for relief, says nothing about the power of drugs and everything about the power of restraints—social, physical, and psychological. Their idea was to test the animals in a truly benevolent environment, and to see whether addiction was still the inevitable result. If it was, then drugs deserved to be demonized. If it wasn't, then perhaps, the researchers suggested, the problem was not as much chemical as cultural.

I know a junkie. Emma is her name. At sixty-three years old, she is a science dean at a small New England college, and even when she's not in her office, she's stylishly dressed, today in linen pants and a scarf the color of merlot. A few months ago, something bad happened to the bones in Emma's back. The vertebrae, which snap together like Legos, began to loosen and slip. To ease the pressure, she went under the knife and came up to consciousness with a surgical seam and one brown bottle of OxyContin, the medicinal disks releasing her to a place without pain.

Opium, called in olden days the Sacred Anchor of Life, the Plant of Joy, Milk of Paradise, written about by classic Greek physicians as curing "chronic headache, epilepsy, apoplexy, tightness of breath, colic, lilac poison, hardness of the spleen stone, the troubles to which women are subject, melancholy and all pestilence." Opium, a strange substance harvested from the leggy poppy plant with its testicular pod full of seed; in nineteenth-century England, nursing women used to brew the poppy plant's seeds, drink the tea, and quiet their fitful infants. Opium, possibly the precursor to Ritalin, the first psychotropic, sold in the streets of smoky London as "Infant's Quietness" and "Mrs. Winslow's Soothing Syrup

Emma Lowry, however, has a different view of the drug. Surgery cured the bad bones in her back but left her with "a terrible dependence. I never much thought about drugs, never much cared for them one way or the other, but I'll tell you, I'll never look at a poppy plant and think it's pretty—never, ever again," she says when I visit her in her home, a solar-paneled contemporary with high white walls. Today, Emma is reading a book by George Eliot, talking on the phone to her staff about hiring procedures, and in between that, telling me her tale. She doesn't need to tell me really. I can see it, in the way, after two hours without a dose, her body begins to quiver; I watch her ease two tablets from the bottle, place them on the pad of her tongue. She could, it seems, no more refuse these pills than a plant could deny the sun it tilts toward.

Hers is a common, undisputed story. Our predecessors may have thought opium an elixir, but we know better, we with our needles gone blunt from sharing, our collective nasal cavities collapsing. We know drugs are addictive. If you mainline heroin long enough, you will develop a taste for it. If you smoke crack cocaine, you will be rushed and rocked and later feel the need for more. We think these things because the media and the medical establishment have repeatedly told us it is so, their proof in PET scans showing brains bright red with craving.

And yet, in the end, even proof itself is a cultural construct. Bruce Alexander, Ph.D., a psychologist who lives in Vancouver, British Columbia, will tell you this. He has spent his life studying the nature of addiction and has come to the conclusion that it does not reside in the pharmacology of a drug at all, but in the complex weave of unsupportive societies. According to Alexander, there is no such thing as a chemical that *causes* addiction, as, say, anthrax causes pulmonary distress. In Alexander's schema, addiction is not a fact, but a narrative, and one quite poorly plotted. Therefore, he very much doubts the stories of the Emma Lowrys, or the AA converts, or the research by E. M. Jellinek, who was the first physician to dub alcoholism a disease in the 1960s, and the later research by James Olds and Peter Milner, who found that animals in cages will choose cocaine over food until they starve to death, boned rodents. Instead, Alexander has two stark claims: (1) there is really nothing "inherently addictive" about any drugs, and (2) repeated exposures to even the most enticing drugs do not usually lead to problems.

"The vast majority of people," Alexander says, "will use even the most addictive substances, and will use them perhaps repeatedly, but there is NO inexorable progression to hell."

History may prove him right. Prior to the temperance movement, when opium was legal, addiction levels remained at a steady one percent of the population. Despite the Emma Lowrys of the world, Alexander can recite studies that support his view like some musicians play scales, in full command of their keyboards—the study, for

instance, done fifteen years ago, that showed the vast majority of hospitalized patients exposed to consistently high doses of morphine were able to come off without a problem once their pain had resolved, and the Ontario household survey, which showed that ninety-five percent of Ontarians who use cocaine do so less than once per month. In a 1974 San Francisco study that followed twenty-seven regular cocaine users over an eleven-year period, all respondents remained gainfully employed; only one, during the decade, had turned into a compulsive imbibier. Eleven of the respondents reported they had used their addictive drug daily at some point, but were no longer doing so. Seven of those eleven had reduced their consumption from seven to three grams. Alexander is especially fond of citing the Vietnam War as a natural experiment in drug addiction; ninety percent of the men who became "addicted" to heroin on the war fields stopped using once they hit home turf, stopped simply and quietly, never to go back to compulsive use. And then there's the excellent crack cocaine survey: a 1990 study of young Americans which showed that 5.1 percent of them had used crack once in their life, but only 0.4 percent had used it the month of the interview, and less than 0.05 percent had used it twenty or more days in the month of the interview. "Therefore," crows Alexander to me, "it would seem the most addictive drug on earth causes persistent addiction in no more than one user in one hundred."

We could go on. There are still more studies to prove his points, and Alexander likes to sound them. In fact, he likes to rant and rave. He speaks in a soft voice tinged with a bit of British, I think, but there is something compulsive in his talk, his eyes wide and sort of startled behind their oval glasses, his folded hands tightening to prove a point. "Do you use any drugs yourself?" I ask him, because he sometimes seems a little tilted. He says, "With special friends, I use acid. I don't use it regularly, but it has provided me with the opportunity for profound self-understanding." He pauses. I'm waiting. "Once," he says, "I took some LSD and felt my head was in a dragon's mouth, and when I looked down, my lower body was in

another beast's mouth and I thought, 'Okay, I'll just lie down and die.' So that's what I did. My heart seemed to stop beating. I knew not to fight the beasts. As soon as I stopped resisting, the monsters turned into a yellow bed of flowers, and I floated away. Since then I have not feared my mortality."

"How long ago was that?" I ask him.

"Twenty-five years ago or so," he says.

Well, I think that's a pretty good advertisement for acid. Not only does it break you into Buddhism faster than you can crack the easiest koan, but it keeps you there without, apparently, much follow-up.

I eye him, warily. As a psychologist I have worked in substance abuse facilities, and I have seen firsthand the powerful chemistry of craving. I'd like to dismiss Alexander as a pure propagandist, except there is this problematic, delightful, fascinating fact: Alexander has facts, in the form of his own ingenious experiments, to prove his theories and substantiate the studies he so likes to quote. You can resist him, or you can come with him, here and here and here, to the oddest places, where your assumptions die down and in their place, an open field—strange sorts of flowers, all of them unexpected.

BRUCE ALEXANDER WAS raised in "a red, white, and blue" household. His father, an army officer and later an engineer for GE, spent the last years of his life insisting he be called Colonel Alexander. At nineteen years of age, Alexander, whose early photographs show a heartbreakingly handsome man, married a heartbreakingly beautiful woman, and together they moved to a tiny town called Oxford, Ohio. Oxford was often cold, and the Ohio River made a dull gray cut through the tasseled cornfields. The marriage went cold quickly. Alexander was studying psychology as an undergraduate at Miami University when he saw Harry Harlow's famous monkey tapes. "I thought, 'Here is a man who is studying the nature of love, and I am unlucky in love, so I should seek this man as my mentor.'" Which he did. He wrote Harlow a letter and was invited to Madison to study

for his master's and doctoral degrees. Alexander went, fully expecting to learn something, or everything, about the ties that bind.

He traveled, then, across the land, exchanging one cold state for an even colder one, although he had no idea at the time. He arrived at Harlow's lab to be immediately assigned to the maternal deprivation experiments, recording how many times a day a motherless mother monkey bit or otherwise abused her young. He watched the monkeys, but he watched still more carefully Harlow himself. "He was a terrible drunk," says Alexander. "He was always, always intoxicated. I thought, what would propel a man to so absent himself from the world? I thought about that a lot. I came to Harlow's lab wanting to study love, but I wound up contemplating addiction."

The Vietnam War broke out. Alexander, now divorced, left his wife and two toddlers for Canada, because "I became radicalized. I could not live in this country anymore." Across the border, he signed on as an assistant professor at Simon Fraser University, and as chance would have it, the psychology department assigned him to teach a course in heroin addiction, something he knew little about. He did an internship himself at a substance abuse clinic in Vancouver, and it was there he first began to consider addiction in ways distinctly non-pharmacological. "I especially remember this one patient. He had a Christmastime job as Santa Claus in a mall. He couldn't do his job unless he was high on heroin. He would shoot up, climb into that red Santa Claus costume, put on those black plastic boots, and smile for six hours straight. I began to consider then that the current theories of substance abuse were wrong; that people used, not because they HAD to pharmacologically, but because the substance was one valid way of adapting to difficult circumstances."

This thinking violated the theories back then and continues to go against the theories of today, despite the frequent nods contemporary researchers make to the importance of "complex factors." Read enough contemporary conventional substance abuse literature, and you'll note that it all starts out with an acknowledgment that environment plays a role, and then it slides lickety-split into the inevitable

lockstep electrical and chemical cascades that overtake the human brain, the Harlow heart. Back in the 1950s, there was a lot of very compelling research into the physiological mechanisms of addiction, and that research dominated the day, and today as well. In 1954, at McGill University, two young psychologists, James Olds and Peter Milner, were the first to discover the fact that a white lab rat will monomaniacally press a lever to receive electrical brain stimulation in what was thought to be "the reward center." In several famous variations of the original Olds and Milner experiment, scientists such as M. A. Bozarth and R. A. Wise hooked the animals up to self-injecting catheters and let them get high as kites while they slowly starved to death. These demonstrations ended, quite literally, in bones, bones, delicate lattice work, white piping, whiskers. In still another set of experiments, the white lab rats would receive an opiate bolus if they were willing to cross an electrical field that delivered severe shocks to their padded paws. Now, a brief digression into the anatomy of the paw. Despite its leathery feel, its cracked and calloused appearance, an animal paw has nearly as many nerve endings as the head of a penis; it is sensation packed in pink. And yet, the rodents crossed the charged field, flinching, squealing, and then collapsed on the other side, sucking up their drug through a straw.

Well, this was compelling evidence for the pharmacological power of certain substances, was it not? This was compelling evidence that addiction is a physiological inevitability. After all, you could replicate these experiments in monkeys, and there were human correlates everywhere, drifting down our inner-city streets, rummaging in our trash. Alexander, however, read the research and was not convinced. He followed Olds and Milner's work. The two psychologists were getting quite famous; in fact, perhaps they should not be this story's subplot, but its main meat, Olds and Milner; Alexander was virtually unknown. Olds and Milner decided they wanted to locate the brain's "pleasure centers" and hypothesized that they existed in the subreticular formation. They split a rodent skull or two, implanted tiny electrodes here and there on a brain no bigger than a bean, appending

the electrodes first with dental glue and later, for stability, with tiny jeweler screws, and then stepped back to see what would happen. Here's what happened: The rats appeared to love the small cortical sizzles. An electrode placed just the tiniest bit to the right caused the animal to become incredibly docile; a little bit to the left and it practically panted in pleasure; a little down and it licked its genitals until they were awash in gloss; upward and the appetite expanded expansively. Olds and Milner hypothesized that throughout the brain there are hot spots of pleasure, and they proved this by showing that when the rats could self-stimulate by pressing a lever that delivered a pulse to their exposed brains, they would do so up to six thousand times an hour if the electrode was embedded just right.

"Just right," it turns out, was in what's called the median forebrain bundle. That, Olds proudly proclaimed, was the pleasure center. I myself went to see this bundle, because, well, pleasure's hard to resist. A friend of mine who works in a rat lab introduced me to another friend who works in a rat lab, and I watched a "sacrificed" animal's meninges being peeled back to reveal the coils and rumples of cognition, volition, and there, a few skeins and gray strands, the weave of pleasure, surprisingly monotone.

Alexander, meanwhile, was counseling his heroin abusers, most of them dirt poor and disaffected. Why, Alexander wondered, if the pleasure center is so easily stimulated by pharmacological agents, if we are so easily taken over, then why do only a portion of users become addicts? Certainly all of us are in possession of the delicious but sadly plain-looking median forebrain bundle. Alexander knew what the rest of the researchers were forgetting, back then, in the 1960s and 1970s, when many magazines featured the newly found country of pleasure on its cover, the brain aloft, on a blue stem. Alexander knew that physiological "facts" exist in complex sets of emotional and social circumstances; pharmacology is linked to luck and weather, coincidence and pay raises, white beards and plastic presents. He knew these things, but he had no proof. He wanted proof.

Groups of psychologists and pharmacologists began to hypothesize about the nature of drug addiction, based on the pleasure center findings. Drugs, perhaps, are like chemical electrodes. They excite that dormant median forebrain bundle, causing it to crave more and more, the same way scratching a bug bite only ignites the itch.

That's the simple explanation. But it's not very specific or scientific. On a pharmacological level, researchers began to claim an interesting story. We have in our heads a little pharmacology factory. We have endorphins, which are exactly like opiates, the body's natural pain killers; we have dopamine; we have serotonin—we all know about that—a drug of calm and reason, and, left to its own devices, the body just manufactures these little vials of goodness, in moderate amounts, to get us through. However, when we start importing from foreign countries, taking, say, Mexican dope into our balanced blood or Chilean crack still smoking in its bowl, then our body thinks, "Okay, let's take a break." We stop producing our own natural drugs and come to rely on an external source, a kind of mixed-up foreign economic policy that leaves us depleted in the end, without internal resources. In other words, our body adapts to the synthetic input by ceasing its own private production. This is called, in fancy terms, "the neuroadaptive model," and it poses, once again, that drugs inevitably throw off our homeostatic systems and make it so we must cross distant borders.

"But," says Alexander, "let's take the dopamine depletion hypothesis. You use cocaine enough and your brain stops producing dopamine, so you have to take more cocaine, which excites dopamine production. Let's start with that hypothesis. There's no hard evidence that the dopamine depletion causes people to crave more cocaine." I decide to call in a conservative, the former assistant drug czar, a Yale man, Herb Kleber. "Of course there's evidence," he says to me. "Have you seen the PET studies? There's definitely dopamine depletion in a cocaine user's brain and that depletion is strongly associated with increased craving."

Yes? No? Maybe? In no other segment of psychology do you get,

perhaps, such conflicting answers than in drug studies, where politics and science do not so much inform as infuse each other.

"Look," says Joe Dumit, a professor of psychology at MIT. "PET studies can be unreliable. It's easy to create images that look like they're showing a great change, but those images can be misleading. Who knows?" Dumit sighs. Studying the brain all day sounds hard. It's an endless, hopeless exercise in trying to use the self to see beyond the self. Just give me a glass of wine.

ALEXANDER WANTED PROOF. He was living in Vancouver, a beautiful city edged with sea. He observed other scientists' junkie rats. They had, in some cases, catheters inserted into their raw shaved backs, their cages cramped and dirty. Maybe here was proof, its bare beginnings. Alexander thought, "If I lived like that in a cage, I'd get as high as possible too." What would happen, he wondered, if he removed the cage or, in other words, altered the cultural constraints? Would the inevitable physiological fact of addiction stay the same in happier surroundings? Alexander wondered this to himself and smiled. He has an incredibly sweet smile, two dents of dimples on either side of his face, a nick in his chin like some strange being touched him way back when, in the womb. He smiled and thought, "Rat park." And then he began to build it.

Instead of a small cramped cage, Alexander and coinvestigators Robert Coombs and Patricia Hadaway constructed a two-hundred-square-foot housing colony for their white Wister lab rats. Into this space, which they heated just right, they put down delicious cedar shavings and all manner of bright balls and wheels and tin cans. They made sure, as this was to be a co-ed colony, that there was ample space for mating, special space for birthing, room to roam for the toothy males, warm nests for the lactating females. Then, Alexander, Coombs, and Hadaway painted the walls of the rats' Ritz Carlton in jeweled greens and saffrons. They painted deciduous trees, mountains ribboned with roads and studded with tiny trees, creeks flowing over smooth

stones. They cared little for the actual environmental accuracy of the backdrop. Jungles gave way to evergreens; snow melted into sand.

Alexander, Coombs, and Hadaway devised a few different experimental conditions for the rats. One they called the Seduction. This condition is predicated on the fact that rats have a sweet tooth and are rarely, if ever known, to turn down dessert. In the Seduction condition, the investigators put sixteen lab rats into the fancy rat park and kept another sixteen in the standard laboratory cages, where space was cramped and isolation extreme. Because plain morphine is bitter, and rats hate bitterness, the researchers gave both sets of rats morphine-laced water sprinkled with sucrose, at first just a little sucrose, but as the days progressed, more and more, until the drink was a veritable daiquiri of sugary delight, delivering supposedly irresistible opioids in an irresistible liquid. To both sets of rats, they also gave plain old tap water, which must have looked so gray and filmy, next to the stocked and glowing bottles.

Here's what they found: The cramped and isolated caged rats loved the morphine-laced water right from its subtle, sugary start, slurping it up and, I imagine, falling down dazed, their pink eyes stoned, their miniscule wizened feet waving slowly in the airy air. The rat-park residents, however, resisted drinking the narcotic solution, no matter how sweet the researchers made it. While they did occasionally imbibe (females more than males), they consistently showed a preference for the straight H₂O and when the two groups were compared, the caged isolated rats drank up to sixteen times more than the park residents, clearly a finding of statistical significance. Highly interesting is the fact that when the researchers added Naloxone to the morphine-laced water in the rat park, the rat-park rats reversed their aversion to the narcotic water and drank it. Naloxone is a substance that negates the effects of opioids but spares the sugary taste of the conduit. This rather stunning finding shows, perhaps most clearly of all, how rats, when in a "friendly" place, will actually avoid anything, heroin included, that interrupts their normal social behaviors. The rats liked the sweetened water, so long as they *didn't* get stoned. At least in rodents, opiates are

actually, in favorable situations, distinctly undesirable, which is a far cry from our understanding of them as inherently tempting.

We think these results are socially as well as statistically significant. If rats in a reasonably normal environment consistently resist opiate drugs, then the "natural affinity" idea is wrong, an overgeneralization of experiments on isolated animals.

These findings are compatible with the new "coping" interpretation of human opiate addiction if one keeps in mind that rats are by nature extremely gregarious, active, curious animals. Solitary confinement causes extraordinary psychic distress in human beings and is likely to be just as stressful to other sociable species, and therefore to elicit extreme forms of coping behavior such as the use of powerful analgesics and tranquilizers, in this case morphine.

It may also be that socially housed rats resist morphine because it is such a powerful anesthetic and tranquilizer. As such, it interferes with a rat's (or a person's) ability to play, eat, mate and engage in other behaviors which make life rewarding.

The Seduction experiment showed that there is, in fact, nothing inherently, inexorably seducing about opiates, and as such it stood as a real challenge to the temperance mentality, which rose to prominence in this country as prohibition laws came into effect and which, in one way or another, weaves and has woven through so much of addiction research. In 1873, a journalist observing a temperance rally wrote, "Then the ladies, joined by the spectators, sang, 'Praise God from whom all blessings flow,' while liquors were rolled into the street. Of the women around, some were crying, a few alternately singing and returning thanks . . ." You can see that quote as the barely visible fuel behind Olds and Milner's work, behind the current drug wars and the scientists who support them, and behind the naysayers, like Alexander, who have done some ingenious things to refute a superstition so entrenched we don't even know we hold it.

THE EXPERIMENT, HOWEVER, was not complete. Alexander, Coombs, and Hadaway successfully showed that rats will resist even the most irresistibly delivered drug if it interferes with the alternatively gratifying opportunities available to them. However, the research team had another question, and this one had to do with addiction already in progress. They had tried to start an addiction in the fancy rat residences, pretty unsuccessfully. The opposition, however, could easily say, "Fine. Give a rat Nautilus equipment and sex twenty-four hours a day and it won't get high. In the real world, people are more vulnerable, and they may begin to use at a bad point in their lives, and once they've started an addictive pursuit, they cannot stop. The withdrawal is so painful, it in and of itself guarantees continued use." So to test this assumption, the researchers again took two sets of rats and kept one set in their cages. The other set they moved to rat park. Over the next fifty-seven days, which is a good long time in heroin time, they made junkies out of each and every rodent, giving them no liquid to drink except the morphine-laced water. "Long enough," writes Alexander, "to produce tolerance and physical dependence."

They then again provided both groups with both plain and morphine water. Predictably, the caged group continued to partake in the morphine; the rat-park group, *even when already* addicted, however, did not choose the morphine solution regularly and in fact decreased their morphine use, despite withdrawal. The implications: addictions in progress are not inexorable. As drug researcher Stanton Peele points out, everyone seems to agree that nicotine is even more highly addictive than heroin, and yet ninety percent of people who start smoking quit on their own, without any "program" or "sponsor" or "professional help." But what about withdrawal? Alexander suggests that withdrawal may not be the force we think it is. "Rats in rat park showed what looked to be some minor withdrawal signs, twitching, what have you, but there were none of the mythic seizures and sweats you so often hear about." Well, maybe not for rats, but surely for humans, as we have seen it before our very own eyes. Retorts Alexander, "The vast majority of people who experience heroin

withdrawal have something like a common cold. That's it." His point, borne out by his rat-park findings: while withdrawal is real, it is not necessarily the force our media has described, what with the flagrant flus and deep tissue miseries. And more importantly, withdrawal does not consign the user to repeated use, if the rats are any example. Alexander says, "I think withdrawal, like drugs themselves, is consistently overplayed; it's part of the narrative people have heard about drugs, and so continue to tell; it's the paradigm by which drug users interpret what may be in fact only discomfort, not agony. Certainly the rats did not appear to be in agony. Neither were the Vietnam vets or the scores of others who start, go through withdrawal, and then stop."

Alexander's research suggests that addictions are in fact quite subject to free will. Rats and humans pick up the proverbial pipe and then put it back down, no problem. And when they don't put it back down, it's not because there's something inherently irresistible about the substance, but because the particular set of circumstances the mammal finds itself in offers no better alternatives than such destructive snacking. Addiction in Alexander's world is a life-style strategy, and like all human-constructed strategies, it's malleable to education, diversion, opportunity. It's a choice.

Alexander remembers rat park well, even though he's sixty-two now and he did the experiment over twenty-five years ago. He remembers addicting his animals and then watching, waiting, to see what would happen. "We talked about it all the time, over dinner, on weekends. My kids came up and met the rats, did some data collection. It was of course tremendously exciting to see all the commonly held notions about addiction so challenged by the rats. I've had only one good idea in my life," Alexander says, "and that was it. But one good idea, who can complain about that?"

I don't hear wistfulness in his voice when he utters this statement, but maybe something ever so slightly disappointed, even though he denies it. The fact is, while the rat-park study is extremely significant in its findings, and poses relevant challenges to ourselves collectively

and individually, the fact is, no one paid much attention, then or now. "We wrote up the findings," Alexander says. "We wanted them to be published in *Science* and *Nature*. That's where they should have gone. But the papers were rejected. Again and again. It was disappointing." At last a well-respected but smaller journal, *Pharmacology, Biochemistry, and Behavior*, published the rat-park findings. "It's a good journal," Alexander says, "it has as much credibility as you could ask for, but it's not as widely read. It's, it's pharmacology."

ALEXANDER'S CAREER, with its psychosocial slant, remained modest, while in the meantime, biological paradigms rose to prominence, spinning off still more scientific studies. In the 1970s a Stanford researcher, Avram Goldstein, discovered the body's natural opiates—endorphins—and speculated that heroin abusers were deficient in this endogenous substance. He hypothesized that injecting addicts with endorphins would eliminate their cravings; the strategy failed completely, but it didn't matter. It got good press because it was a biologically based explanation in a culture with a taste for just such explanatory models—models of molecules, models that eschew or even ignore the issues Alexander cares most about: race, class, the nuanced circumstances of our multilayered lives.

Alexander is angry sometimes. He accuses the biomedical establishment of suppressing important scientific information about the complexity of drugtaking for political purposes. After all, if rat park's findings were given their due, we would have to clean up our inner-city projects and change our policies, funding education over medicalization. Alexander's critics, however, accuse him of distorting information in hopes of inflaming a public debate, and being the star at its center. This according to drug czar Kleber, who is proud of his Yale education and disdainful of any research "north of the Connecticut River." According to Kleber's Ivy League compass, rat park happened in the scholarly equivalent of the tundra, which may be why the drug

czar says, "When I first heard of that Vancouver experiment, I thought it was ingenious. Now I think it has all sorts of methodological flaws."

"Like what?" I ask him.

"I can't remember," he says.

"Alexander says you say addiction is pretty much inevitable, that exposure leads to addiction."

Kleber says, "That's ridiculous! I never said that and I don't think that."

"If you don't think that," I say, "then why aren't you for legalization?"

"Caffeine," he says. "How many people are addicted to caffeine in this country?"

"A lot," I say.

"Roughly twenty-five million," he says, "and how many are addicted to nicotine? Roughly fifty-five million. And how many are addicted to heroin? Two million. The more people exposed to a drug, the more become addicted. Nicotine is easy to get, so we're swarming with addicts. If heroin were easy to get, the number of addictions would dangerously, dangerously rise."

And yet, Alexander claims that addiction levels remained steady before temperance, at merely one percent. He also says that saying availability leads to addiction is like saying food leads to obesity, which clearly it doesn't in the vast majority of cases.

Kleber continues. "Now," he says, "how long would it take you to get a glass of beer?"

"A minute," I say, thinking about the mason-green bottles we have cold in the fridge.

"And how long would it take you to get a cigarette?" he asks.

"Twenty minutes," I say, picturing the convenience store several blocks away.

"Right," he says. "And how long," he says, his voice dropping, "would it take you to get cocaine?"

Thank god we're on the phone during this conversation, because my face goes red and my eyes, I feel them flinch. The fact is, I could

get cocaine or its chemical equivalent in three seconds flat, along with various hallucinogenic plants my chemistry-loving husband has found advertised on the Internet. We're a family of pharmacophiles.

"How long?" he repeats, and is it my imagination, or do I hear something a little threatening in the drug czar's voice now, like he suspects?

"A long time," I say, too quickly. "Hours. Weeks."

"So you see my point," he says. "Availability increases exposure, exposure increases addiction."

And yet, here I am, as exposed as anyone could possibly be; we have access to poppy straw tea, magic molecules, prescribed hydro-morphone, tiny white disks, and none of it interests me. I have occasionally wondered why it is that I have no desire to try the bountiful mind-altering drugs in my midst, while my husband, who has chronic pain, likes to partake. I often worry about my husband, who not infrequently sits down with a cup of tea and two hydromorphone tablets and sips until his pupils turn tiny. I have said to him, "You'll soon be hooked, if you aren't already," and he has said to me, being a rat-park fan himself, "You know the REAL research, Lauren. I'm in a colony, not in a cage."

IN THE MEANTIME, there are the actual addicts, who care not a whit for the theories or the politics, because they are simply suffering in their skins and want relief. There is, for instance, Emma Lowry, whose own body tells a tale it is difficult to ignore. While she, like my husband, lives in the human equivalent of rat park, she seems unable to extricate herself from the soft sway of her medicines. Every time she tries to cut down her dose, "Awful things happen. My stomach goes into spasm." The next time I visit her, she seems desperate. "No one told me this stuff was THIS dangerous," she says. She has taken to using an exacto knife to shave off tiny crescents from the pill, making it minutely smaller each time she swallows—a slowly diminishing dot—in the hopes of easing herself from her hook. At the

same time, an OxyContin scare is rippling through our country. The *New York Times Magazine* writes on its cover "OXYCONTIN" and everywhere frightened pharmacists are putting up signs, "No OxyContin here," in the hopes of diverting break-ins.

It is not hard to find evidence that goes against rat park's conclusions. Wealthy people, with all their needs met, are often substance abusers, and there is compelling evidence that shows the brain's significant alteration when consistently exposed to opioids or cocaine, an alteration that very well might make free will irrelevant. Alexander, of course, has an answer to these objections: the rich are as caged by social strife as any of us; the PET scans of altered brains prove only correlation, not causation. You can listen to Alexander's counterarguments to his critics, but listening does nothing to dispel the undeniable reality that despite what Alexander showed way back when, in his painted rodent dreamland, the experiment has done little to alter the way we collectively think about substances and thus, to some degree, experience them. Therefore, what makes the experiment great? Kleber says, "The experiment's not great." Alexander himself says, "Rat park's not famous. Why would you include it? It has a small cult following, but that's it." True, rat park may not be big; neither is Sherwood Anderson's *Winesburg, Ohio* or Richard Seltzer's essay, "Lessons of a Knife." Those works, however, are little gems that resonate in ways subtle but strong. More importantly, they became the unacknowledged models from which more recognized literature was spun; so it is with Alexander's rats. His experiments were in part responsible for the famous surveys, cited earlier in this chapter, which showed how unlikely addiction is in the human population. His experiments in part led to intensive studies of cancer patients on morphine, and the fascinating research that is now being done on the bio-psycho-social differences between using morphine for pain, where it rarely leads to addiction (Emma excluded, of course), and using it for pleasure, where it supposedly more often leads to trouble. Most importantly, his experiments were in part responsible for an interesting string of work that followed the effects

of environment on human physiology. In 1996, research conducted in Iran showed that women living in single-family housing units had significantly higher fertility rates than women living in multifamily units, meaning fertility goes down as crowding goes up. Studies of prisons have shown that as density increases, so too do problems like suicide, homicide, and illness. Humans in small spaces perform far worse on tests of problem solving than do their counterparts in more capacious settings.

THE DECIDEDLY LUKEWARM reception rat park got may have disappointed Alexander, but not for long. Unlike his teacher, Harlow, Alexander does not appear prone to depression or substance abuse, although he does mention, quite a few times, that he has been unlucky in love. That lack of luck, however, didn't seem to get in the way of his continued, rather vivacious explorations into the question at hand. Rat park went the way of a midlist book, and he just kept on thinking, planning, joining. He joined the board for the Portland Hotel, a downtown Vancouver establishment where HIV-positive addicts can come for clean needles, a warm room, and a way to die in dignity. He studied China's old opium dens, where the walls had a fine white scrim of powder clinging to their craggy surface. He began to read Plato, "the first psychologist," even as Simon Fraser University withdrew his funding based on rat park's publicity failure. Eventually, the university, in conjunction with animal rights activists, who found the rat lab's ventilation system inadequate, shut the whole thing down, only to reopen it months later as a student counseling service—without a ventilation system upgrade. "It wasn't okay for the rats," Alexander says, "but for humans it was fine."

He speaks without bitterness, though. Instead, labless and ratless, Alexander turned toward history, funneling himself back into the portholes of the past, looking to long-lost cultures for still more clues as to how addiction does and doesn't happen. He was interested to find that there have been many times in human history when addic-

tion was practically nil: the Canadian Indians, for instance, prior to assimilation, had a negligible addiction rate, as did our very own British brothers before the upheavals of the Industrial Revolution, when people farmed and lived off the land and watched the moon, that medicinal disk in the sky. Alexander found that addiction rates seem to grow not as drug availability increases, but as human dislocation, the inevitable result of a free-market society, becomes commonplace. His theory: a free-market society treats its people as products, to be uprooted, moved, altered, according to economic need. "At the end of the 20th century, for rich and poor alike, jobs disappear on short notice, communities are weak and unstable, people routinely change families, occupation, technical skills, languages, nationalities, software and ideologies as their lives progress. Prices and incomes are no more stable than social life. Even the continued viability of crucial economic systems is in question. For rich and poor alike, dislocation plays havoc with the delicate interpenetrations of people, society, the physical world and spiritual values that are needed to sustain psychosocial integration." In the absence of these things, says Alexander, we, like rats in cages, turn to substitutes, not because the substitutes are alluring in and of themselves, but because our circumstances are deficient, we without our gods.

In the final analysis then, Alexander the renegade is really a traditionalist in tie-dye. Years of radical inquiry have led him to this conservative conclusion: what matters are the ties that bind, love, affection, and the daily rhythms that rise from these—friendship, family, a small plot to work. Weekends he spends on his small island farm, writing in the early mornings, structuring a simple life. Maybe here is where he and his opponent, Kleber, can come together. Alexander believes that difficult circumstances lead to addiction; Kleber believes it is exposure to fixed pharmacological properties. But in the end these different scientists are asking for similar things—that the web of social structure be beautiful and meaningful, that families replace gangs, that tradition provide direction in a wasted culture. Writes Kleber, "Our policies should aim to reduce drug use

and addiction to a marginal phenomenon. . . . At its best America strives to give all its citizens the chance to develop their talents." Says Alexander, "When we provide our children with heritage and beliefs that bring shape to culture, we reduce the likelihood of psychopathology." In the end it comes down to dignity, and both men believe in it.

I WISH I could wend my way to a solid ending, but in the study of solid substances, everything is, finally, as wavy as an opioid dream. According to "findings," Emma Lowry, because she took opiates for pain and not for pleasure, should not be addicted, but she is. According to "findings," my husband, who has consistent exposure, should be addicted, and he isn't. Kleber claims addiction rates rise with exposure, and he has the figures to show it; Alexander says if that were true, poppy-growing cultures would be addicted cultures, and they're not. Who knows what the facts are here.

In the end, then, I decide to see for myself. Sample size: one. Hypothesis: none. I'm in a cage or a colony, I'm not sure which. My house is large, my life good, my human interactions rich and robust, but I'm a free-market gal, as dislocated as any in this new millennium, where I have no religion, no extended family, no god. What I do: I take my husband's hydromorphone pills. I decide I'll take them for fifty-seven days, like Alexander's rats, and then see what happens when I try to stop.

I swallow two. I swallow three. Sure enough, I get high. I get happy. The air feels silky, and when I see a seagull in the Target parking lot, I think it's the most beautiful bird ever, sugar-white and winged.

Three days go by. Four. I'm feeling fine. I have weeks of regular nightly opiate use, of mooning at the moon and thinking everything both silly and sweet. During the days, I watch myself. Am I looking forward to my nightly elixir? Am I CRAVING it? I watch for signs of craving just like early in my pregnancy I watched for cramps that

might signal a miscarriage: there, a little something, oh my god, it's happening—did I feel that? Was it a twinge? But there was no blood then, and there's none now. My stomach starts to hurt. For me, the morphine is like a difficult dessert, unpleasant to get down, fun to actually digest, but altogether unremarkable. I'd rather have dinner with a friend than sentimentalize a seagull, in the end. And, after fourteen days, when I stop abruptly, I am a little cranky and stuffy in my nose, but who knows, my kid's got the flu.

What this little experiment shows me is (pick one):

- (a) There in fact is nothing inherently addictive about morphine, and the physiological substrates of withdrawal are overlaid.
- (b) As Kleber might say, I lack the deficient gene that would increase my vulnerability to addiction.
- (c) Because I did not proceed to injection, where the high is higher and the median forebrain bundle more intensively stimulated, I wasn't really at any risk anyway.
- (d) I do live in a colony, not a cage.
- (e) No one knows.

Pick one, or none. I myself have really no idea. I'm tired now. And my cortical pleasure centers will call me away from this interpretive task long before I even get close to comprehension; I will be called back to my regular life, where my husband occasionally needs painkillers, where my house leaks on the left side but is warm and familiar, where my child toddles, and the snow falls like latticework outside my window—my world, imperfect, but good enough from where I stand now, apart from it, Kleber here, Alexander there, myself in the midst of their maze.

IN THE END, I want to see rat park for myself. I want to lie in it and feel its space, smell the pungent cedar shavings, crispy in my fingers. I'd like to feel I'm in a land, a time, as honest as the Indians before

they were assimilated, a land, maybe, that has my hand prints in it, that grows because I tended it, erect ears of corn splitting their seams. So I go. Alexander has saved the wooden plywood walls, rat park's backdrop, where the coniferous trees brush the skin of a perfect sky. There are clouds here, pink streaked and white, and a river burbles as it runs toward some sea beyond the backdrop. Imagine living in a place like this, or its human equivalent, a kind of perpetual California without any fault lines, where food sources never diminish, where there are no predators, where the smell is always like the secret insides of your great-grandmother's wood-lined chest. Alexander calls rat park a normal environment: he says, "We suspect that the normal environment provided by our colony allowed the rats enough species-specific gratifying behavior so morphine was irrelevant." But when you see the preserved pieces of the experiment, the painted plywood, when you consider the abundant food, the readily available exercise equipment, the river in its plush streaks of silver, "normal environment" does not come to mind. What comes to mind is "perfect environment," of which I feel sure there are none in the labless worlds we live in. Here may be one of Alexander's biggest methodological flaws. He created heaven and found—no surprise—that in it we are happy. But where is there heaven on earth? Does rat park truly reflect "real life," possible life, or does it in fact only confirm that addiction is only avoidable in a world of utter myth, which is not, never has been, and never will be the human world, we with our dented genes and buildings.

In the end, Alexander—the man unlucky in love, the man married and divorced two times, the man who has just now, at sixtysomething, settled down with his third spouse—in the end this man is a romantic. He believes rat park is possible in our world, that we can construct a culture full of gentle give-and-take. Who knows, maybe he's right. The romantic view of the world, which holds that we are able to actualize our potent selves if only given the chance, is as powerful and persuasive a stance as its opposite, the classical view, my view, rooted in skepticism, even cynicism: life is hard; everywhere

you turn there are flaws; every colony you enter is really a cage, and if you squint hard enough, you'll be able to make out the bars around your body. That's my view, but I can't, and certainly don't want, to prove it.

BACK AT HOME, I receive a phone call from Emma Lowry who tells me that she's finally "off" those "damn drugs." She says she'll never use painkillers again. I know if I call Alexander up and tell him Emma's story, he'll begin to rant and rave. He'll find all sorts of smart reasons as to why it doesn't contradict his data: maybe she was still in the cage of pain and wasn't quite admitting it; maybe her happy home was really dimmed with an unacknowledged depression; maybe her husband has never been so supportive; maybe she works too hard. He would say what he's said to me so many times before: "I have never met a person, Lauren, never, in my thirty years of searching, who had adequate internal and external resources and who was an addict. Never. Find me one and I'll throw out all my beliefs."

I won't call up Alexander and tell him about Emma. Nor will I call up Kleber and tell him about my husband, and how he, exposed and immersed, seems to have sidestepped major drug problems. I don't want to hear the inevitable diatribes that come from both sides of the question. The real drug war may not exist in our streets, but in our academies, where scientists hiss and search, compulsively, intoxicated by the questions they are pursuing. And what, finally, are these questions? What does the fierce debate about addiction really stand for? It doesn't stand for itself, that's clear. Addiction is really, it seems, about questions of chemistry and its intersection with free will, responsibility and its relationship to compulsion, deficit and how we can creatively compensate or not.

I head upstairs to my study. It is night now and the little painted lamp on my end table glows, infusing the shade in tones of yellow and gold. The walls here are also warm, painted halo-yellow, hung with prints of plums and peaches on sketched stems. I love my study. I love

how the cat, fat and furry, sleeps curled on the daybed, almost groaning as he purrs in pleasure. The cat is a new addition to our household. We took him in because we have mice, many mice, scurrying under our floorboards, hanging off the coils in the back of the fridge. Even now, with the cat, I can hear them chirping in the heating duct, a new litter I suppose, their naked heads, the smell of milk. Mice. I can hear them when I sleep, infiltrators, gymnasts, they prance and birth and scratch. They chew tiny holes in the Ritz Cracker boxes, so the spoils of comfort spill out. Mice. I hope they're happy here.