

# Heartbreak

A PERSONAL AND SCIENTIFIC  
JOURNEY



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# HEARTBREAK

A Personal and Scientific Journey



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*In memory of John Cacioppo and Jaak Panksepp, who taught us that emotions matter, especially the tricky ones, and in loving memory of Penny Williams, who told me I was going to be okay.*

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# INTRODUCTION

The invention of the ship is also the invention of the shipwreck.

—JENNY OFFILL, WEATHER

**M**y biggest problem at the moment was the portable toilet. It was just too heavy. It was weighing down the bow of my canoe, which was already loaded with 80 pounds of water and a double-walled cooler filled with fairly ridiculous items like coconut milk, rib-eye steaks, and cage-free liquid whole eggs. Also, I'd brought a fetching beach parasol. But why does something you shit in in the desert have to be made of ammunition-grade 20-millimeter steel? It doesn't! I just needed some plastic bags. The ill-conceived toilet was just one of many small and giant mistakes that had led me to this moment, cursing alone in the wilderness. There were the mistakes in my marriage, the cosmic mistake (to my mind) of the divorce, the wrong men I'd fallen for in the year since my separation, the friendships I'd overburdened. All of these were, yes, weighing me down. If I thought about the heavy-shit metaphors too long, my head hurt.

Most recently, there was the poor decision, made because I was possibly having a hot flash, to launch this leg of my journey a day early, at 7 p.m., in fading light, just above a small rapid, in a canoe that felt like it weighed a thousand pounds. Then again, it was August and it was 97 degrees in Green River, Utah. Even a teenage boy would be having a hot flash. Camping at the shadeless town park was an unbearable option. Running a desert river for a month in the height of summer was probably another bad decision. But here I was. An outfitter named Craig had rented me the 15-foot canoe

with a broken thwart, splintering gunwales, and the tanker toilet. The boat was the color of lipstick you wear when you're trying too hard. It did, however, match the parasol.

"Just remember," he'd said, "if you don't know knots, make lots!" He laughed, snapped a picture of me surrounded by my gear, and drove off in his air-conditioned pickup.

To be clear, I do know how to tie knots and I generally know what I'm doing in the wilderness. But my own canoe lay upside down in Washington, DC, where it petulantly awaited better days and where, until recently, I also petulantly lay, often right side down, after my husband decided to leave our 25-year marriage because, among other things, he said he needed to go find his soul mate. Still, nothing in my prior canoeing experience had fully prepared me for the reality that I could barely alter the trajectory of this boat once I got it into the river. Only a few small inches of freeboard lay between the water and the top of my gunwales. I stared at the approaching shoals. I glared at the toilet, glinting like a smug brigadier in the twilight.

The river split into two channels. I chose the one on the right, but the current grew fast, shallow, and bumpy. The canoe scraped over some rocks, then some more, and started to list sideways. I pushed my feet back into my river shoes and hopped out into the shin-deep water, figuring I'd have an easier time keeping the boat upright and off the rocks if I were outside it. My heart was beating fast, and I chastised myself for not tying down my gear better. The boat bumped along, upright, and I jumped back in. I knew I needed to pull over and camp, soon, before it got any darker. I grounded the boat onto the first available scruffy gravel bar. For my first night ever spent alone in the wilderness, I'd be camping within sight and earshot of the interstate.

By this point, I'd already been paddling the Green River for two weeks. With friends and family, I'd run Split Mountain and Desolation Canyon, among other stretches. Everything was so aptly named. The first white men to run these canyons 150 years ago hated most of it. "Country worthless," scrawled one in his journal. Now it was just me and the sound of air brakes. I spent the night awake, berating myself for existing in the first place, then berating my husband, and then scheming about how to jettison the toilet, because there was no way I was hauling that thing for the next two weeks.

I was here because I needed to jettison so many things. A year's worth of fear, dismay, and loneliness, some bad habits acquired to stave off those feelings, a peevish and lingering sense of abandonment, my stubborn attachment to a man who was clearly no longer in my boat.

A year and a half earlier, I'd had a life that seemed worth keeping afloat. I was a science journalist with two trusting and kind-hearted teenagers and a husband who ran a venerable and useful nonprofit. We had moved a few years before from Colorado, and I missed our former life out west, but we had a comfortable house near the Potomac River and a goofy mutt to walk the towpath with. I thought our long marriage was fundamentally sound and totally salvageable. We'd seen each other through academic degrees and professional milestones. We'd had decades of fun living in beautiful places, and we'd produced these amazing little people who depended on us for love and hope and stability in a world that seemed to be growing only more confusing and unjust. Our friends' marriages weren't perfect either, but they worked things out. As far as I could tell, nobody here was miserable or violent or crazy or impossibly annoying.



HAVING NEVER BEEN heartbroken before, I tended to dismiss portrayals of it in popular culture or literature or even by my friends, I'm sorry to say, as overwrought. But one of the first stages of heartbreak, I soon learned, is feeling stunned, even if you shouldn't have been. I'd been used to feeling in control. But you can't game heartbreak. It overtakes you. When my husband decided to live on his own after three decades of togetherness, the clichés of heartbreak felt not like melodrama at all. I felt like I'd been axed in the heart, like I was missing a limb, set adrift in an ocean, loosed in a terrifying wood. I felt imperiled. Our dyad had dissolved into vapor, and I couldn't grasp what remained. I still plodded through my days, cooking for our son and daughter and walking the dog and making most but not all of my deadlines. I would have moments of collapse, and then I'd get back up feeling vacant and dense at the same time.

We spent another six months still living together and drafting—painfully drafting—a detailed parenting plan. By the time he took his small



blue suitcase and rolled it out the kitchen door forever, I'd already lost 20 pounds I didn't want to lose. I couldn't imagine a life without him. Or ever trusting men again, or being able to love or be loved. Having just turned 50, it all seemed even more impossible. I was completely, existentially, freaked.

This is heartbreak.

Now I would be facing an uncertain future without the partner I'd had since I was 18 years old. I'd have to figure out somehow who I was without him and if I could be anyone even worthy of that effort. There was no blueprint. None of my close friends was divorced. I felt, in so many new ways, alone.

This, also, is heartbreak.

Physically, I felt like my body had been plugged into a faulty electrical socket.

In addition to the weight loss, I'd stopped sleeping. I was getting sick: my pancreas wasn't working right. It was hard to think straight.

This, too, is heartbreak, and it's what finally propelled me to seek some answers.

Not only did I want to figure out what was happening to my body, I needed to roll myself upright and get better.

I TRIED TO find refuge everywhere I could, and that meant sometimes in the rational arms of fields like neurogenomics and the psychology of social rejection. The latter sounds like middle school snubs but actually describes a vast ocean of pain that stretches from the playground to broken marriages like my own. The research was both fascinating and unnerving. Despite having lost my mother to cancer when I was in my 20s, I'd never experienced the disorienting sorrow, shame, and peril of losing my life partner.

Romantic heartbreak can cause complex emotional trauma. As with loss associated with the death of a partner, it can dismantle your identity. But the grief of this type of heartbreak is compounded by rejection, which, I came to learn, we humans feel as a deeply evolved threat to our survival.

Breakups are common, and heartbreak is nearly universal. And yet, it wallops us. About 39 percent of all first marriages in the US end in divorce. Psychologists rank this event—or what one 1852 medical textbook called

“the slow tortures of connubial disturbance”—as one of the top stressful and consequential life experiences we have, just below the death of a loved one.

For as long as there has been literature, writers have rendered heartbreak—connubial or otherwise—as akin to physical pain and, specifically, to a kind of pain bound to the expectation of more pain. Catullus used the word *excrucior*, the particular and agonizing feeling of being nailed up by your palms, exposed. Susan Sontag, dumped by feckless Jasper Johns when he left a New Year’s Eve party with another woman, was similarly graphic: “It hurts to love. It’s like giving yourself to be flayed and knowing that at any moment the other person may just walk off with your skin.” And here’s poet Anne Carson, whose lover of five years told her he no longer felt what he called spin: “Woman caught in a cage of thorns. . . . / unable to stand upright.”

There was plenty of heartbreak art—*so much art*—but I wanted science. If this was such a common and devastating experience, why wasn’t there a validated protocol for recovery beyond weep-dancing while belting out Gloria Gaynor? Where was the research and what did it say? You’d think after a million years of hominins sighing at the moon over lost love, we would have figured this out by now. Why did nature design us to be so deeply, even operatically, sad? Why was heartbreak so hard to get over? If I learned the answers, maybe I could speed it up and feel better.

MUCH HAS BEEN written about the science of falling in love, but very little about what happens on the other side. Only in recent years has science begun to excavate some of the literal biological pathways of this brand of pain. If you place someone who has recently suffered heartbreak in a scanner, parts of the brain light up that are very closely related to the parts that fire after receiving a burn or an electrical shock. And if some study subjects are unfortunate enough to receive an electric shock after heartbreak, the pain will hurt more. If, however, you shock someone who remains in a loving relationship, and they hold their loved one’s hand or gaze at a picture of their devoted squeeze, the pain will hurt much less.

Even more remarkable is the understanding that heartbreak reaches far beyond emotional anguish to influence physical health. People who have

suffered lost love face an elevated risk of serious medical woes. It's not just their metaphorically sundered hearts, although cardiac risk is a part of it. Their cells look different; their immune systems falter; even their language skills drop off. Why would evolution equip us with an operating system so easily weakened by an event as common as the denial of love?

“Heartbreak is one of the hidden land mines of human existence,” one genomics researcher told me. The language of heartbreak may sometimes sound mundane, but the havoc it inflicts on our brains and bodies is trenchant, profound, and, until recently, understudied. Among the documented downstream effects of rejection, grief, and loneliness are fragmented sleep and fatigue, increased anxiety, poor impulse control, depression, cognitive decline, altered gene expression, and early death.

Why should your immune system care if you've been dumped? What skin does a white blood cell have in the game of love? Plenty, it turns out. Some of our cells listen for loneliness. They adjust their work accordingly, sometimes with devastating consequences for the rest of your potentially feeble, truncated life.

I was eager to reverse course, since my cells, unfortunately, appeared to be listening. New advances in genomics and experimental psychology promised to show me exactly how they were responding and what I might do about it.

I set out to experiment on myself, to see if I could understand the way heartbreak changes our neurons, our bodies, and our sense of ourselves. I would have my nervous system monitored while viewing pictures of my ex. At different points after splitsville, I would measure my threat-mediated biomarkers of inflammation. By better understanding the ailment, I would perhaps find some remedy.

This book traces the general trajectory of heartbreak, from the moment of shock to feelings of rejection, to grief and loneliness, and, finally, toward a measure of repair. All paths through heartbreak are different. Mine was messy and strange and often unexpected. I came to dismiss some of the conventional approaches to recovering from rupture, especially the ideas that you shouldn't form other attachments too quickly and that the key to healing is the commonly traded bromide of “loving yourself first.” Both of these exhortations fell short for me. I had to improvise a different course.

Ultimately, I would orient toward the far shore of heartbreak through balms much less obvious but supported by evidence: beauty, agency, and purpose.

I would try a regimen of solutions and substances, mostly legal but not entirely. I would travel across the US and to England and Croatia to meet the researchers, practitioners, and ordinary people who were ahead of me in learning how to move on. Some of them were dealing with loss and serious emotional trauma. I'm not equating my pain with theirs, but I believe that we can learn from people in extremis about the systems governing our emotions and our health, and the lessons and potential treatments that apply to all of us. What I found was extraordinary, surprising, and immensely helpful. It would change the way I think about the world, our health, our relationships, and what it means to be human.

I would hike my heart back to life whenever I got a chance. I would try trauma cures, nature cures, psychedelics in a makeshift clinic, companionship of many flavors. *If you don't know knots, make lots.* And before too long I'd end up here, at river mile 119, silt working its way under every fingernail. I knew what wreckage lay upstream. Everything else was a question mark. It was clear there would be no fast heartbreak hack. Also, I hated scorpions. But at least I knew what I needed. For now, it was to lighten my load.

PART ONE

**SHATTER**

# 1

## BRIDGE TO NOWHERE

The boundary to intimacy is asserted by industry.

—LENA ANDERSSON, ACTS OF INFIDELITY

Our love affair began in a hurricane. I'd been in college exactly five weeks. I felt lucky to be there, on Yale's gothic campus surrounded by crisp mid-Atlantic air. I had been ready to leave home. Here, there was so much easy abundance. In the dining hall, a place the size of a hockey stadium, mountains of vegetables rose from the buffet and I was inexplicably dazzled and slaked by the constant stream of cool, amber apple juice. I'd already met friends I loved, admired, and envied. They were like me but they had better home addresses and the easygoing affability that often grows in those zip codes.

Life was busy in the best way. After reading David Halberstam's *The Amateurs* over the summer—a book that was, like all of his books, about men—I joined Yale's freshman women's crew. It was a small group of rowers, including my new best friend, whom I had talked into joining with me. Every afternoon we jogged with our tall and tan teammates to the boathouse. We learned to carry the eight-person shells over our heads and

deposit them carefully on the river in a graceful synchronous swoop. We climbed in and grasped our solid, heavy oars. Then we reached with our hands beyond our bent knees and dipped our blades in the smooth water like spoons poised to stir tea. In unison we contracted our cores, released the springs in our legs, and pulled with all our might. The narrow boat glided like a skate blade, quiet and powerful.

I had never felt so much a part of a group, and I liked it. Then there was the water, so much water. On Saturday mornings I jumped on my rusting 10-speed. I rode fast to the harbor on Long Island Sound, where I'd found a work-study job on a schooner that took city kids out to feel the brief freedom of a sea-scented breeze and to learn some biology. At the time, I didn't think about the boats that were to anchor so many threads of my life. I just liked them. We sent small buckets from the schooner to the basement of the Sound to gather pungent benthic layers of mud. We talked about organic pollution causing blooms of algae that suck up oxygen in the water. When this happens, other species can't get enough oxygen and die. I knew I was living life in the oxygen zone.

MY HOME LIFE back in New York City had been much quieter, shared with my mother and a small Lhasa Apso named Albert. We liked to say it backward, Trebla. It sounded like Trouble, and that fit.

But it was my father who delivered me to southern New England that fall in his '70s Dodge van. It was a vehicle better suited to carrying canoes in the mountains than to parallel parking. We'd taken it out west nearly every summer, running rivers by day, camping or sleeping in the van by night. In New Haven, we relayed my boxes of sweaters and cassette tapes up four flights of stone stairs on the freshman quad. I kissed Dad's bearded cheek, grabbed my backpack and hiking boots, and walked downstairs to join a group headed out on a three-day orientation camping trip. I worried about a boy from Jordan wearing a crisp trench coat and dress shoes. I met a tall woman named Ann who wore the same model of hiking boots as me, and they looked like they were the same big size. We would become fast friends. And I met the group's leader, a senior wearing John Lennon glasses and a blue bandanna ringing his head like a line of latitude.

That day, my first day of college, standing in the quad under the bright sun, he and I joked that we had the same last name.

“We must be listed next to each other in the college directory!” he said.

“We should get married some day!” I responded, and we laughed. I probably wouldn’t have made that joke if I didn’t on some level already feel it could be possible. He was beautiful but approachable: tall and lean, with rosy rock-climber muscles under his shorts and T-shirt. Under the bandanna flowed longish, messy hair, and below that a smile that didn’t quit.

This was the first year of the hiking orientation program, which he had started, raising the money himself, because he believed nature was the best place to make new friends. So many freshmen wanted to sign up that there had been a selective lottery. I found out later I hadn’t made the cut, but he had rescued my application and put it in the Go pile because I had camping and river-running experience. He, it turned out, liked boats too.

On the bus ride to the Catskills, I sat a couple of rows in front of him and listened to his funny, goofy misadventures about parking his best friend’s car on a steep hill and having to winch it out of a forested gully in the middle of the night, about hitchhiking through Arkansas, about fasting in the wilderness and having visions only of pizza. He was both man and boy, worldly and funny and naive. He was someone who could protect a girl in the woods and make her laugh while he was doing it. A boy who was both safe and reckless was, to me, irresistible.

In 1974, TWO psychologists ran an experiment in Canada that became known as the Creaking Bridge study. Wanting to know which chemicals and impulses in the brain were linked to romantic love, they selected two walking bridges relatively close together: one wide and solid with firm handrails crossing a small rivulet; the other narrow, swaying, and rickety (with sketchy low cables to hold) above swift rapids. They asked a comely research assistant to stand in the middle of one bridge and then the other. Each time, she asked passing men to fill out a questionnaire, offering that each could call her at home if he wanted to talk further (in 1974, it was assumed that most dudes alone on a bridge were straight). Only 2 out of 16 men who crossed the safe bridge called her. But 9 out of 18 men from the rickety bridge followed up.



Since then, numerous studies have also suggested that excitement, novelty, and even anxiety can enhance sexual attraction and romantic love.

Perhaps this is why, five weeks later, I didn't think twice about heading out into the hurricane. The storm was named Gloria. It made me think of dancing to Laura Branigan in middle school. *Will you meet him on the main line / or will you catch him on the rebound?* He'd hatched a plan to climb to the top of the stone bell tower to experience the storm. Mere mortals like us were not allowed near the bells, which resounded every hour throughout campus. But he had a friend named Miles who knew how to pick locks. This thrilled me. It all thrilled me. We packed our sleeping bags and some rope and met Miles after dark outside the tower's thick beveled wooden door. Miles did his thing and the door creaked open. We climbed 284 stone stairs, past the bells to a narrow ladder leading upward. We heaved ourselves through a small portal to an open-air balcony surrounded by elaborately carved finials. For a moment I pictured Kim Novak falling to her death in *Vertigo*. It was a dark night and very windy. It smelled like wet stone.

Wearing rain gear and hiking boots, Miles was wholesome for such a master criminal. His story was remarkable. As I recall it, he grew up poor but mechanically inclined in New Jersey. He learned how to jump ignitions. He stole cars, but returned them. His senior year of high school, he took the SATs and aced them. But his grades weren't great, so he faked a transcript and letters of recommendation, and was admitted to this venerable institution, where he majored and excelled in physics. The outlaw, though, hadn't quite left him.

I was pleased that my crush knew people who were rogues yet had both practical life skills and high test scores. They knew how to pay bills and tie bowlines and trespass into a hurricane. The storm was strong, but not as dramatic as we'd hoped. We watched the sky swirl and the big raindrops turn sideways and then we climbed into our sleeping bags. Mr. Rock Climber tied a rope around his waist and around mine.

"You will not blow away," he said, wrapping a Gore-Texed arm around me. We slept on the narrow ledge in a figure eight of ropes. We were becoming entwined.

It was our creaking bridge moment.

FOR MOST OF our many years of marriage, being closely bound through a life of shared adventures and large and small triumphs and challenges felt like a lovely miracle.

My parents had six marriages between them. His had two. After husbands Number One and Two, and during most of my childhood, my mother conducted an on-again, off-again 15-year affair with a married colleague. I knew of it from about the time I was nine. We used to pass his wife on the street, and my mother would point her out to me and whisper a conspiratorial comment about her hat or her coat and we would titter. True to form, Mom pronounced both her lover's name and his wife's backward, as if that conferred discretion. He was Notlim. She was Erdried.

By comparison, my romantic life starting freshman year was undramatic, well behaved, and stable. It felt to me like living in a sweet foreign land with a much simpler syntax. We moved through college and graduate school, getting engaged on a snowy trail when I was 24, setting up house out in the Rocky Mountains and skiing and kayaking and working. I knew I was fortunate. We lived as a team, feeling lucky and healthy and strong. Our work was good, really good, for both of us. I wrote articles and books about science and nature and other things that made me curious. He worked to protect large natural landscapes and together we played in them. In those early years, before kids, our play was fun and challenging and always drawn against spectacular scenery.

We used to kayak a particular stretch of the Gunnison River in western Colorado. It features several big, technical rapids that scared me, especially one called Boulder Garden. One weekend, the water was high and I didn't like the way the forceful current piled into a giant rock on river left. I could picture my kayak (with me in it, maybe upside down) getting pinned against it. We scouted the rapid and talked through all the moves.

"Do you want me to stand on the rock just in case?" asked the husband.

"Yes!"

In my memory, I did end up too close to that rock, and he did push my boat off it. Or maybe I just imagined it, but I knew he would have. That's what marriage supplied, among other things: a certain amount of Bubble Wrap.

Once our kids arrived, after nine years of marriage, the balance of work and play shifted dramatically to work and parenting. Somehow our tasks

grew disappointingly, dismayingly uneven, with more work for him and more of the parenting load for me. Outdoor adventures had been our glue, and now, while still fun, the adventures were fewer and packed with Cheerios, baby carriers, and constant vigilance (mostly mine) for signs of toddler meltdown. We didn't know how to connect so well as a couple in this new reality. Mostly, though, life was busy and rich and meaningful. The husband was a good man, if distracted.

As the years went by, instead of keeping each other company through the rapids and the ski chutes, we were more likely to take turns or go alone. If we were together, he was more likely to say, "I'll see you at the bottom." I thought that must be a measure of healthy self-reliance, or growing up. What I thought then was, I can do this! What I see now is that it was the beginning of the end.

THE LOVE THAT began in a sudden burst of weather ended much more slowly. We paid less attention to each other. He would leave for a business trip without saying goodbye, and then he wouldn't call from the road. Even in town, he wasn't great about returning texts and emails. I felt like he didn't help out enough in ways that were important to me. His eyes would light up when younger, prettier women came around. I wasn't always there for him either. I had misgivings about his demanding new job that moved us from Colorado, which I loved, to Washington, DC, which I didn't. I sometimes found it hard to muster the enthusiasm to hear about his workday or his latest athletic training regimen. I had more than a full plate of my own.

In our last decade together, we tried therapy briefly several times. But we were still not feeling supported by each other. When we are depleted, marriage can become a constant tally of each other's inadequacies. As novelist Tessa Hadley puts it, "Marriage simply meant that you hung on to each other through the succession of metamorphoses. Or failed to." We were failing. Somewhere along the line, we had let each other go. I felt sure we could put all the pieces back, but he was already boxing up the puzzle.

The details of what finally drove us apart don't really matter. We were both culpable. I still loved him but I had stopped putting him first. He wanted to find someone else who could. One day, I was cooking dinner before friends arrived, greens draining in the colander, when I asked for an