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Please Pass the Hacksaw

Childhood is, or has been, or ought to be, the great original adventure, a tale of privation, courage, constant vigilance, danger, and sometimes Calamity.

—MICHAEL CHABON

By second grade, it was clear that although Zack Smith could sit in a chair, he had no intention of staying in it. He was disruptive in class, spoke in a loud voice and had a hard time taking turns. His parents fed him a series of medications for ADHD, attention-deficit hyperactivity disorder, many of which didn't work. Zack, who attended school in West Hartford, Connecticut, was placed in special classrooms, where he showed a propensity for lashing out. Twice suspended, he was miserable. He didn't seem to care about anything at school. When his parents realized that his path would likely lead to worse trouble, they pulled the ripcord on eighth grade.

Where Zack eventually landed was spread-eagled on an east-facing slab of quartzite in Pendleton County, West Virginia. His chin-length, strawberry-blond hair curled out beneath a Minion-yellow helmet. A harness cinched his tee shirt—the sleeves of which have been ripped off—obscuring the *Call of Duty: Advanced Warfare* lettering.

"I have a wedgie!" he bellowed out from 20 feet up.

Belaying him was another fourteen-year-old, scrawny, earnest Daniel. Earlier in the day, Daniel had asked, "Do I have to belay? I'm only ninety-five pounds." Both kids still looked a little apprehensive, but there was no question they were paying full attention to the wall of rock and to the rope that united them. Yesterday in "ground school" under a picnic awning in a campground near Seneca Rocks, they and twelve other scrappy kids from the Academy at SOAR learned how to tie figure eights and prusiks, the knots that would save their lives. Their ages spanned five years, but crossing this vast spectrum of puberty, the younger kids looked like they could be the square roots of the biggest ones. Physically, Zack occupied an awkward middle ground, lanky and knock-kneed, sporting an alarmingly deep voice behind a crooked smile.

He gradually moved his right foot to a new nub and pulled himself higher. He scrabbled upward, finally victoriously slapping a carabiner on the top rope before rappelling down. "Oh man, my arms hurt," he said at the bottom, his pale cheeks flushed from sun and exertion. Daniel accidentally stepped on the climbing rope and, per the rules, had to kiss it. This happened so often no one remarked on it. For a moment both boys cheered on Tim, a small boy from Atlanta with eyeglasses so thick they looked like safety gear. The inspirational name tape on the back of his helmet read T BONE SIZZLER. A group chant began: "Go Tim go-oh, go Tim!"

Before enrolling in the outdoor adventure-based boarding school for grades seven through twelve, Zack, like a lot of these boys, had already spent some summers at SOAR, a well-established camp based in Balsam, North Carolina, for kids with ADHD and related learning disabilities. Its founding principle—radical several decades ago and still surprisingly underappreciated—was that kids with ADHD thrive in the outdoors. Since then, ADHD diagnoses have exploded—to the point where 11 percent of American teens are said

to have it—while recess, physical education, and kids' access to nature have miserably shriveled.

Zack's first SOAR summer involved a three-week stint of horse-packing in Wyoming. Before the trip, he would have preferred to stay home and play video games. "I hated nature," as he put it. But something clicked under the wide Wyoming skies. He found he was able to focus on tasks; he was making friends and feeling less terrible about himself. Zack turned his restlessness into a craving for adventure—which is perhaps what it was meant to be all along.

THE HUMAN BRAIN evolved outside, in a world filled with interesting things, but not an overwhelming number of interesting things. Everything in a kid's world was nameable: foods, creatures, constellations. We were supposed to notice passing distractions; if we didn't, we could get eaten. But we also needed a certain amount of stick-to-itiveness so we could build tools, stalk game, raise babies, and plan big. Evolution favored early humans who could both stay on task and switch tasks when needed, and our prefrontal cortex evolved to let us master the ability. In fact, as David Strayer and his marching band of neuroscientists in Moab made clear, our nimbleness in allocating our attention may be one of humanity's greatest skills.

Most of our ancestors had brains that craved novelty and that wanted to explore, to a degree. This worked out for us. Our species expanded into more habitats than any creature the earth had ever seen, to the point where humans plus our pets and livestock now account for 98 percent of the planet's terrestrial vertebrates. But evolution also favored some variability in our brains, and some of us pushed exploration more than others, or were simply more comfortable in the new, unfamiliar habitats. These are the sensation-seekers among us, the ones who thrive in dynamic environments and can respond quickly to new information.

We have come to see the restlessness that was once adaptive as a pathology. A recent advertisement for an ADHD drug listed the “symptoms” to watch for: “May climb or run excessively, have trouble staying seated.”

It’s worth taking a look into the brains of kids like Zack, because not only do these kids need nature-based exploration, but exploration needs them. Zack and his tethered gang of misfits hold clues to the adventure impulses lurking in all of us, impulses that are increasingly at risk in a world moving indoors, onto screens and away from nature. Attentional mutants everywhere have saved the human species and they may yet spare us from Michael Chabon’s dreary pronouncement that “the wilderness of Childhood is gone; the days of adventure are past.” But first, we have to understand the connections between learning and exploration, childhood, play and the natural world.

If spending time in nature could be so helpful to adults, I wondered what it could mean for adolescents whose brains were still so pliant. Since kids learn everything faster than we do, it made sense that the outdoors could provide huge payoffs to kids who needed a mental recharge or a new framework for learning. Could being outside help them change patterns of emotion and attention?

The fact is, all human children learn by exploration. So I had to wonder if we are cutting them off at the knees, not just with medication, but through overstructured, overmanaged classrooms and sports teams, less freedom to roam and ever-more-dazzling indoor seductions. Modern life has made all of us, along with our kids, distractible and overwhelmed. As McGill neuroscientist Daniel Levitin explains, we consume 74 gigabytes of data every day. After school, teens now spend vastly more waking hours on screens than off them.

“The digital age is profoundly narrowing our horizons and our creativity, not to mention our bodies and physiological capabili-

ties,” said adventure photographer James Balog, even as his hard-won chronicles of a changing planet are delivered to millions digitally. Yet Balog, who roamed the hills until dark as a kid in rural New Jersey, can hardly get his eighth-grade daughter off her phone. “These are hours not being spent outside,” he said. “It kills me.”

It’s one thing to let kids unplug and run loose in the woods in summer, but taking the whole academic year outside—the SOAR students alternate two weeks on a forested campus and two weeks in the field—reflects either parental desperation, intrepid educational insight, or a combination of the two. Zack’s backstory as an institutional rascal is a common one, especially among boys, who are diagnosed with ADHD at more than twice the rate of girls. History is full of examples of the fortunate ones who went on to become celebrated iconoclasts like wilderness advocate John Muir, who spent his early childhood sneaking out at night, dangling from the windowsill by his fingertips, and scaling treacherous seaside cliffs in Dunbar, Scotland. Frederick Law Olmsted hated school. His indulgent headmaster used to let him roam the countryside instead. Mark Twain left school at twelve, yet clearly believed in the value of a good float trip. Ansel Adams’s parents plucked their restless boy out of school, gave him a box Brownie camera, and took him on a grand tour of Yosemite. It was unschooling, California-style.

Olmsted, looking back on his life, identified the problem as the stifling classroom, not troublesome boys. “A boy,” he wrote, “who would not in any & under all ordinary circumstances, rather take a walk of ten to twelve miles sometime in the course of every day than sit quietly about a house all day, must be suffering from disease or a defective education.”

The Academy at SOAR—accredited for just the last three years—was determined to find a better way. The school enrolls just 32 students, 26 of them boys, divided into four mixed-age houses. Each kid has an individualized curriculum, and the student-teacher

ratio is five to one. Tuition is a steep \$49,500 per year, on a par with other boarding schools, although you won't find a Hogwartsian dining hall or stacks of leather-bound books. The school still covers the required academics, as well as basic life skills like cooking, but finds that the kids pay more attention to a history lesson while standing in the middle of a battlefield or a geology lecture while camping on the Ordovician formation.

"We started from scratch," said SOAR's executive director John Willson, who began working there as a camp counselor in 1991. "We're not reinventing the wheel—we threw out the wheel." The school's founders didn't have any particular allegiance to adventure sports; they just found that climbing, backpacking, and canoeing were a magical fit for these kids, at these ages, when their neurons are exploding in a million directions. "When you're on a rock ledge," Willson says, "there's a sweet spot of arousal and stress that opens you up for adaptive learning. You find new ways of solving problems."

Frances Kuo, the University of Illinois researcher known for her window studies in public housing, has also examined the relationship between ADHD and outdoor activity. Her studies have been small but suggestive. In one experiment, exposure to nature reduced reported symptoms of ADHD in children threefold compared with staying indoors. In another, she had 17 children aged eight to eleven with ADHD walk for 20 minutes with a guide in three different settings: a residential neighborhood, an urban downtown street and a park setting. After the park walk they performed so much better memorizing numbers in backward sequence that the improvement was equal to the difference between having ADHD or not having it, as well as to the difference between not being medicated at all and experiencing the peak effects of common ADHD medication. More recently, a study of 2,000 children in Barcelona found that those who spent more time playing in green spaces were

reported by parents to have somewhat milder symptoms of inattention and hyperactivity.

In a 2004 paper, Kuo and her colleague, Andrea Faber Taylor, proposed an explanation for how Attention Restoration Theory might apply. The right prefrontal cortex—the brain's organizing, judging, task-focusing real estate—is known to be less active in children with ADHD. If nature allows the right prefrontal cortex to recharge, it could boost attention in these kids.

ADHD symptoms, it turns out, are somewhat contextual. If you're the sort of person who thrives on chaos and stimulation like a lot of extreme athletes, sitting in school all day may well suck out your soul. But with the rise of industrialism, educators thought all kids should be in standardized classrooms. "ADHD got its start 150 years ago when compulsory education got started," said Stephen Hinshaw, a psychologist at the University of California, Berkeley. "In that sense, you could say it's a social construct."

Not only will exploratory kids feel bored and inadequate in conventional schools, he said, the constrained setting actually makes their symptoms worse. Maria Montessori went so far as to suggest in 1920 that middle-schoolers should ditch lecture-based instruction altogether and head for farm and nature schools where they can move around and learn by doing. For kids like Zack Smith, school feels especially stifling and rule-bound; they act up; they may get moved into an even more restrictive environment, sometimes with chain-link fences, guards, and neurotropic meds that go beyond ADHD to deal with the ensuing anxiety, depression, and aggression. Sometimes they end up in trouble, or, as Zack feared might happen to him, getting "gooned" in the middle of night by burly strangers who would pack him off to a residential therapeutic program that may look like Outward Bound in the brochure but end up feeling like a gulag.

Interestingly, researchers have observed similar patterns in lab

rats, who, let's face it, suffer the ultimate cosmic gooning. When Jaak Panksepp, a neuroscientist at Washington State University, restricted the free exploration and play of his young rats, their frontal lobes (which control executive function) failed to grow properly. As adults, they behaved like rat-style sociopaths. "We had the insight that if animals don't play, if there are not sufficient spaces for them to engage, they develop play hunger," said Panksepp. "They have impulse control problems and eventually problems with social interactions."

In contrast, animals given time to play appear to develop deeper and more durable neural hardware. Panksepp's studies show that just thirty-minute play sessions help young rats release brain-growth factors and activate hundreds of genes in the frontal cortex. He points out that while common stimulant medications for ADHD like Ritalin and Adderall may improve attention skills and academic performance in many kids, they do so at the cost of killing the exploration urge, at least temporarily. "We know these are anti-play drugs," he said. "That is clear and unambiguous."

The bigger question is whether the drugs—and all the enforced sedentary behavior—squeeze the adventure impulse out of kids longer-term. Psychologists tend to disagree on this point, but the truth is, no one really knows. It's not a boutique question. Of the 6.4 million diagnosed kids in America, half are taking prescription stimulants, an increase of 28 percent since 2007.

WHEN SOME OF the teens first arrived at SOAR, they were still putting their clothes on backward. They forgot to eat or they couldn't stop. They lashed out in anger and they were easily frustrated. ADHD symptoms appear to express themselves differently in boys and girls. The classic symptoms in boys, which are better understood, are hyperactivity, impulsivity, and distractibility. We all sit somewhere on the continuum of these traits, but people with more severe

symptoms appear to have different chemistry in the parts of their brains governing reward, movement, and attention. They may have trouble listening or sitting still, and they get distracted by external stimuli. Easily bored, they tend to be risk-takers, looking for charged activities that help flood their brains with the feel-good neurotransmitters like dopamine, serotonin and norepinephrine, which otherwise get gummed up in the ADHD brain. Kids with ADHD are more likely to suffer head injuries, accidentally ingest poisons, and take street drugs.

Long-standing research suggests that kids like Zack—and indeed, most kids—would be better off in dynamic outdoor learning environments from the very beginning. As Erin Kenny, founder of Cedarsong Nature School on Vashon Island, Washington, has put it, “Children cannot bounce off the walls if we take away the walls.”

It’s what the man who founded kindergarten had in mind in the first place.

Friedrich Fröbel was born in 1782 near Weimar, in the heart of Germany’s ancient forests and lush vales. A student of natural history who came of age under the spell of Romanticism, he was a lover of the French philosopher Jean-Jacques Rousseau. “Everything is good as it comes from the hands of the Author of Nature,” Rousseau wrote to Fröbel’s delight; “but everything degenerates in the hands of man.” In *Emile*, Rousseau made a case for cultivating curiosity and freedom in childhood. This radical notion came to influence every aspect of progressive education. In Fröbel’s day, children under the age of seven typically stayed at home or were farmed out to crèches of convenience. Fröbel understood that an education filled with nature and art could instill a lifelong readiness to learn. He believed children would also pick up emotional skills like empathy, as well as a profound sense of the interconnection of all living things.

After working in primary education for a number of years, he

started a school for small children in 1837. It was while walking in the woods (walking in the woods!) that he came up with the name: kindergarten. In it, children would absorb the natural world through all their senses. They would grow plants outdoors, exercise, dance, and sing. They would manipulate simple objects like blocks, wooden spheres and colored papers, thus learning, almost despite themselves, the universal laws of geometry, form, physics and design. Fröbel didn't believe in lock-step lesson plans. Children, he said, should be guided largely by their own curiosity and "self-activity." For a while, the idea caught on, but the Prussian government, fearful of instilling free play and, by extension, free atheistic thinking, shut down public kindergartens before Fröbel's death in 1852. Still, his ideas resonated with scores of wealthy, well-connected women who became phenomenally successful international missionaries for the cause. "It was the seed pearl of the modern era, and it was called kindergarten," argues Norman Brosterman in his compelling history, *Inventing Kindergarten*.

Childhood would never quite be the same.

Although, as kindergarten spread to other nations, including America, the concept changed in ways that would have made Fröbel hurl an abacus. He had opposed formal lessons for this age group, and didn't even want alphabetical letters on blocks. But in the late nineteenth century, educators saw the need to prepare children, especially working-class children, for an industrial work life. Kindergarten shifted to more time indoors and the lessons became more programmatic. Despite a brief flirtation with nature schools in the 1960s and 1970s, American kindergarten continued its relentless slouch into sit-down academics.

But Fröbel's naturecentric ideas didn't disappear from Europe. To this day, European kids aren't taught reading and math in earnest until they reach age seven. Germany has more than 1,000 "forest kindergartens" called *Waldkindergarten*, and they are growing in

popularity across northern Europe. In these preschools, kids are out in all kinds of weather, playing with natural materials and pretty much having a ball. I'd visited a school called Auchlone in Perthshire, Scotland, where kids ran happily around climbing trees, playing house in twig teepees and hosting a funeral for a dead frog. For snack time, a four-year-old boy helped light a campfire for making popcorn. The school's director, Claire Warden, is a big fan of kids and fire. She's also a proponent of preschoolers handling knives and challenging themselves physically. She'd told me how after a large tree fell over during a storm, the children had spent days sawing and pounding off sharp bits to make it safer to climb upon. This, she explained, launched a typical, nature-based curriculum: the kids improved their manual dexterity, learned about cause and effect, and practiced teamwork.

Warden knows some of these ideas might be shocking to American parents and their notions of bubble-wrapped childhoods. "We can't avoid all risk," she'd said. As if on cue, a boy in yellow boots stalked by carrying a junior hacksaw. "Junior hacksaw" would be an oxymoron in America, but here it's another teaching tool. Earlier, I'd seen the same boy with a potato peeler. "What we do is hazard assessment, not risk avoidance," she'd said. "Schools that are boring and not engaging will end up costing parents and taxpayers millions when these children are teens."

Today, a tenth of preschoolers in Scandinavia spend nearly their entire days outside, and another huge percentage spends a significant portion outdoors. In Finland, outdoor play is integrated into the day throughout primary school to an astonishing degree: it's common for students to be turned out for fifteen minutes out of every hour.

When I was in Finland, I'd asked a sixth-grade teacher named Johanna Peltola why. She was, like many Finns, extremely pragmatic. "When they go outside and get fresh air, they think more

clearly," she said. And yet, while American education experts sing the praises of the Finnish school system, celebrating the nation's high spot in global academic standings, they routinely ignore the fresh-air factor. Outdoor play isn't even mentioned in Amanda Ripley's chapter on Finland in *The Smartest Kids in the World*.

Interestingly, Finland reports the same percentage of children diagnosed with ADHD as the United States: about 11 percent, mostly boys. But while most adolescents in the U.S. are taking medication, most in Finland are not.

What Fröbel believed, and the Finns practice, science has affirmed. Nature play enhances at least two activities known to develop children's cognitive and emotional development: exercise and exploratory play. A large meta-analysis of dozens of studies concluded that physical activity in school-age children (4–18) increases performance in a trove of brain matter: perceptual skills, IQ, verbal ability, mathematic ability, academic readiness. The effect was strongest in younger children.

Even more intriguing, researchers at Pennsylvania State University have found that early social skills matter more than academic ones in predicting future success. They followed 750 children for 20 years. The children whose kindergarten teachers rated them as having strong abilities to cooperate, resolve conflicts and listen to others were less likely to later be unemployed, develop substance abuse problems, get arrested, live in public housing, or go on welfare. Germany sponsored an even more ambitious study in the 1970s. There, researchers tracked graduates of 100 kindergartens. Half the programs were play-based (although not necessarily outdoors) and half were academic and instruction-based. The academic students made initial gains; but by grade four they had fallen behind their play-based peers on every scholastic and socioemotional measure used. In a move that would have warmed Fröbel's art stations, Germany reversed its trend toward academic kindergartens.

But, alas, not the United States, where little kids spend more time at their desks than ever. Preschoolers in the United States average just 48 minutes of exercise a day in their schools, even though the recommended level is 2 hours, according to a 2015 paper published in *Pediatrics*. Of that 48 minutes, only 33 minutes is outside. A 2009 study in *Pediatrics* found that 30 percent of third-graders get fewer than 15 minutes of recess a day, and another study found that 39 percent of African-American students had no recess compared to 15 percent of white students.

Parents aren't helping much either. Jane Clark, a University of Maryland professor of kinesiology calls toddlers "containerized kids" as they spend increasing time in car-seats, high chairs and strollers, and then shift into sedentary media consumption. According to the Outdoor Foundation's research (funded by the U.S. National Park Service and outdoor industry manufacturers), participation in outdoor activities declined among all children, but declined the most—15 percent—among six-to-twelve-year-olds between 2006 and 2014. Those figures include hiking, camping, fishing, cycling, paddling, skateboarding, surfing, wildlife-viewing and other activities, and do not include organized sports.

In 2004, 70 percent of U.S. mothers recalled that they had played freely outside themselves when they were children, yet only 31 percent allowed their children to do the same, despite a drop in crime since then. British children seem equally tethered. Since the 1970s, their children's "radius of activity"—the area around the home where kids are allowed to roam unsupervised—has declined by almost 90 percent, according to a report by the National Trust. While 80 percent of seven- and eight-year-olds walked to school in 1971, by 1990 fewer than 10 percent did so.

In the U.K., two-thirds of schoolchildren do not know acorns come from trees.

AT SOAR, MANY students arrive on meds, and many stay on them. At all times, the instructors carry sealed messenger bags full of pharmaceuticals strapped to their torsos like baby marsupials. Though Willson emphasized that SOAR is not a way to get kids off ADHD medication, some do find that they can taper off. Zack's parents told me they were planning to toss his anxiety drugs during his upcoming holiday break, and they expected to lower the dose of his stimulant as well. "The changes in him have been nothing short of miraculous," said his mother, Marlene De Pecol. "Now he's just happy."

If, as the research suggests, outdoor free play is so important to kids' physical and mental health, you might expect to see evidence of illness during this seismic generational shift indoors. And in fact, that's exactly what you see, although it's impossible to draw a direct line to a particular cause. The stats are alarming: Preschoolers are the fastest-growing market for antidepressants in the United States. More than 10,000 American preschoolers are being medicated for ADHD. Teenagers today have five to eight times more clinically significant scores for anxiety and depression compared to young people born in the 1950s. Since 1999, the U.S. suicide rate has increased for nearly all groups, with the steepest rise—200 percent—among girls ten to fourteen years old.

It's well known that childhood obesity rates have tripled and allergy and asthma rates have increased dramatically in the U.S. in the last three decades. According to data from the U.S. Centers for Disease Control and Prevention, nearly one in ten children has a vitamin D deficiency. That's 7.6 million children. And—get this—two-thirds, another 50.8 million, are considered vitamin D "insufficient." We need sunlight for all sorts of bodily processes from regulating our sleep and diurnal rhythms to facilitating proper bone growth to boosting immunity. The problem has gotten so bad that rickets, a disease caused by lack of vitamin D, which had been virtually eradicated, has begun to show up in pockets of the U.K.

and America. The incidence has quadrupled in the two countries' children in the last fifteen years.

When you put little kids in green environments, even if it's just some lawn and shrubbery, they start moving. In schools with conventional urban playgrounds, the boys tend to run around more than the girls. But studies in Sweden show the exercise gap between boys and girls narrows in more naturalistic environments. Nature levels gendered play. The kids in forest kindergartens also tend to get sick less often than their indoor peers, and they host a healthier, more diverse array of microbacteria in their bodies.

Zack Smith is one of the lucky ones. Privileged kids have tons of options, from summer camp to beautifully landscaped schools. But if we really care about children's health, connecting more kids to nature and shaking up early and elementary education, we're going to have to figure it out where most of us actually live and work: in cities, in housing developments and neighborhoods and in public and private schools.

I asked my son, now in seventh grade in D.C., how many minutes of recess he gets per day.

"Recess? We probably haven't had recess in three months."

This was a problem. I called the head of his junior high.

"I know," she said, putting on her appease-the-unhinged-mother voice. "I wish they could go outside more, too, but it's been too muddy, and then the corridors get muddy."

In other words, it was a janitorial problem. In Finland, kids keep their boots by the front door. Maybe schools in the United States don't need more iPads and test prep; maybe they just need more Wellies.

FRANKLY, THERE'S NO time to waste. While active exploration improves learning in both kids and adults, it's adolescents like Zack—whose prefrontal cortex is in the very midst of laying down a

lifetime of neurons—who seem to benefit the most. John Green and Meghan Eddy, biobehavioral psychologists at the University of Vermont, exercised some adult and teenaged rats, and then gave them a task to remember how to find food in a maze. The young rats who exercised bested the adults who exercised, doing as well as rats on Ritalin. It seemed the playful, exploratory, and physical adolescent years exist to boost learning in mammals, just as SOAR's Willson intuited. Or, as Green more formally put it, "the adolescent prefrontal cortex is ready to be molded by environmental experience."

So there you have it: the time is now. There's a limited window of opportunity to best launch these kids, and perhaps, in so doing, to safeguard a future of innovative exploration by the very kids who are wired to do it better than anybody else.

The ADHD population is an advance guard. If they can recognize how to better adapt their environments for their brains, there's hope for the rest of us. One thing is clear: human brains seem to grow best when they get some time outside.

After many years languishing in the Formica-filled classrooms of West Hartford, Zack Smith was ready. He and his pals gathered around the fire pit back at camp, bellies full of hamburgers and bread-and-butter pickles. It was very dark out. Tomorrow all fourteen kids would make it the four pitches up Seneca Rocks. A couple of days after that, they'd backpack across the Dolly Sods Wilderness Area, and then they'd visit Stonewall Jackson's grave and read poetry written by the general's sister-in-law. For now, they were tired, if not exactly mellow.

Zack's job for the day was Captain Planet, meaning mighty taker-out of trash. Another kid named Max was Scribe. At sixteen, Max was an expeller of colossal farts, and proud of it. "I don't do anything halfway in the outdoors," he said. He had shared with me on the trail that he was also an expert squirrel hunter, climber, and river runner. When he is done with school, he intends to find a job

guiding. Beturbaned in a purple bandanna, he opened the group journal and prepared to record notes of the day's events under the narrow beam of a red headlamp.

Zack was lying on his back and looking up at the stars. He was impressed. "We don't have these at home," he said.

- MPH,” House Committee on Veterans’ Affairs, June 14, 2011, <http://Veterans.house.gov/prepared-statement/prepared-statement-karen-h-seal-md-mph-department-medicine-and-psychiatry-san>, as quoted in David Scheinfield, “From Battlegrounds to the Backcountry: The Intersection of Masculinity and Outward Bound Programming on Psychosocial Functioning for Male Military Veterans,” diss., University of Texas at Austin, 2014, p. 27.
- 208 They are two to four times: Gail Gamache, Robert Rosenheck, and Richard Tessler, “Overrepresentation of Women Veterans Among Homeless Women,” *American Journal of Public Health*, vol. 93, no. 7 (2003): pp. 1132–36.
- 211 In frightened lab animals: For the role of GCs in memory: J-F. Dominique et al., “Stress and Glucocorticoids Impair Retrieval of Long-Term Spatial Memory,” *Nature*, vol. 394 (1998): pp. 787–90. For the hippocampus: Nicole Y.L. Oei et al., “Glucocorticoids Decrease Hippocampal and Prefrontal Activation During Declarative Memory Retrieval in Young Men,” *Brain Imaging and Behaviour*, vol. 1 (2007): pp. 31–41. For norepinephrine: J. Douglas Bremner, “Traumatic Stress: Effects on the Brain,” *Dialogues in Clinical Neuroscience*, vol. 8, no. 4 (2006): pp. 445.
- 211 Veterans are twice as likely: Jessie L. Bennett et al., “Addressing Posttraumatic Stress Among Iraq and Afghanistan Veterans and Significant Others: An Intervention Utilizing Sport and Recreation,” *Therapeutic Recreation Journal*, vol. 48, no. 1 (2014): p. 74.
- 211 female veterans commit suicide: Matthew Jakupcak et al., “Hopelessness and Suicidal Ideation in Iraq and Afghanistan War Veterans Reporting Subthreshold and Threshold Posttraumatic Stress Disorder,” *Journal of Nervous and Mental Disease*, vol. 199, no. 4 (2011): pp. 272–75.

CHAPTER 11: PLEASE PASS THE HACKSAW

Some of the material from this chapter appeared in Florence Williams, “ADHD: Fuel for Adventure,” *Outside*, Jan./Feb. 2016, published online Jan. 20, 2016, http://www.outsideonline.com/2048391/adhd-fuel-adventure?utm_source=twitter&utm_medium=social&utm_campaign=tweet, accessed Feb. 22, 2016.

- 221 “Childhood is, or has been”: From “Manhood for Amateurs: The Wilderness of Childhood,” *New York Review of Books*, July 19, 2009, www.nybooks.com/articles/archives/2009/jul/16/manhood-for-amateurs-the-wilderness-of-childhood/, accessed July 17, 2015.
- 224 A recent advertisement for an ADHD drug: Mentioned in Richard Louv’s blog post, “NATURE WAS MY RITALIN: What the New York Times Isn’t Telling You About ADHD: The New Nature Movement,” <http://blog.childrenandnature.org/2013/12/16/nature-was-my-ritalin-what-the-new-york-times-isnt-telling-you-about-adhd/>, accessed July 20, 2015.

- 225 Olmsted hated school: From Witold Rybczynski, *A Clearing in the Distance: Frederick Law Olmsted and America in the 19th Century* (New York: Scribner, 1999), Kindle edition location 417. Quote to principal from Kindle edition, location 296.
- 226 Kuo ADHD studies: see A. Faber Taylor et al., “Coping with ADD: The Surprising Connection to Green Play Settings,” *Environment and Behaviour*, vol. 33 (Jan. 2001): pp. 54–77.
- 226 ADHD kids playing in a park study: Andrea Faber Taylor and Frances E. Ming Kuo, “Could Exposure to Everyday Green Spaces Help Treat ADHD? Evidence from Children’s Play Settings,” *Applied Psychology: Health and Well-Being*, vol. 3, no. 3 (2011): pp. 281–303.
- 226 The Barcelona study: Elmira Amoly et al., “Green and Blue Spaces and Behavioral Development in Barcelona Schoolchildren: The Breathe Project,” *Environmental Health Perspectives* (Dec. 2014), pp. 1351–58.
- 227 Kuo and Taylor’s 2004 study: Frances E. Kuo and Andrea Faber Taylor, “A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a National Study,” *American Journal of Public Health*, vol. 94, no. 9 (2004).
- 228 On play and ADHD, see Jaak Panksepp, “Can PLAY Diminish ADHD and Facilitate the Construction of the Social Brain?” *Journal of the Canadian Academy of Child and Adolescent Psychiatry—Journal de l’Académie canadienne de psychiatrie de l’enfant et de l’adolescent*, vol. 16, no. 2 (2007): p. 62.
- 229 “Children cannot bounce off the walls”: Quote by Erin Kenny, cited in David Sobel, “You Can’t Bounce off the Walls if There Are No Walls: Outdoor Schools Make Kids Happier—and Smarter,” *YES! Magazine*, March 28, 2014. http://www.yesmagazine.org/issues/education-uprising/the-original-kindergarten?utm_source=FB&utm_medium=Social&utm_campaign=20140328, accessed July 17, 2015.
- 229 “Everything is good”: The Rousseau quote is from *Émile*, cited in Norman Brosterman, *Inventing Kindergarten* (New York: Harry N. Abrams, 1997), p. 19.
- 230 For more on the tremendous and largely unsung influence of Friedrich Fröbel, see Brosterman, who makes a fascinating case for Fröbelian kindergarten literally catalyzing modern art. Braque, Kandinsky, Le Corbusier and Frank Lloyd Wright all spent years holding cubes and making abstract geometric patterns with Fröbel’s materials, and Wright and Le Corbusier in particular directly credit this for their design sense. Brosterman suggests these influences were largely ignored by art historians because they stemmed from the domain of young children and their women teachers.
- 232 Finns and ADHD: S. L. Smalley et al., “Prevalence and Psychiatric Comorbidity of Attention-Deficit/Hyperactivity Disorder in an Adolescent Finnish Population,” *Journal of the American Academy of Child and Adolescent Psychiatry*,

- vol. 46, no. 12 (Dec. 2007): pp. 1575–83, cited in Daniel Goleman, “Exercising the Mind to Treat Attention Deficits,” *New York Times*, May 12, 2014.
- 232 A large meta-analysis of dozens: B. A. Sibley et al., “The Relationship Between Physical Activity and Cognition in Children: A Meta-analysis,” *Pediatric Exercise Science*, vol. 15, no. 3 (2003): pp. 243–56.
- 232 The Penn State study on social skills: Damon E. Jones et al., “Early Social-Emotional Functioning and Public Health: The Relationship Between Kindergarten Social Competence and Future Wellness,” *American Journal of Public Health*, vol. 105, no. 11 (2015): pp. 2283–90.
- 233 The 2015 *Pediatrics* study on physical activity in preschoolers: Pooja S. Tandon et al., “Active Play Opportunities at Child Care,” *Pediatrics*, May 18, 2015, published online.
- 233 30 percent of third-graders: Romina M. Barros, et al., “School Recess and Group Classroom Behavior,” *Pediatrics*, vol. 123, no. 2 (2009): pp. 431–36.
- 233 “Containerized kids”: See http://www.usatoday.com/news/health/2004-11-05-active_x.htm, accessed Feb. 2, 2016.
- 233 In 2004, 70 percent of mothers: R. Clements, “An Investigation of the Status of Outdoor Play,” *Contemporary Issues in Early Childhood*, vol. 5 (2004): pp. 68–80. Also see S. Gaster, “Urban Children’s Access to Their Neighbourhoods: Changes Over Three Generations” (1991), quoted in R. Louv, *Last Child in the Woods* (Chapel Hill, NC: Algonquin Books, 2005), p. 123. On children and exercise, see M. Hillman, J. Adams, and Whitelegg, “One False Move: A Study of Children’s Independent Mobility,” London: Policy Studies Institute, 1990. And <http://www.dailymail.co.uk/news/article-462091/How-children-lost-right-roam-generations.html>. On preschool diagnoses of ADHD, see http://www.nytimes.com/2014/05/17/us/among-experts-scrutiny-of-attention-disorder-diagnoses-in-2-and-3-year-olds.html?_r=0, accessed July 18, 2015.
- 234 Teenagers today have: J. M Twenge et al., “Birth Cohort Increases in Psychopathology Among Young Americans, 1938–2007: A Cross-Temporal Meta-Analysis of the MMPI,” *Clinical Psychology Review*, vol. 30 (2010): pp. 145–54, cited in M. Brussoni et al., “Risky Play and Children’s Safety: Balancing Priorities for Optimal Child Development,” *International Journal of Environmental Research and Public Health*, vol. 9 (2012): pp. 3136–48.

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