

WINDFALL



THE BOOMING BUSINESS
of GLOBAL WARMING

McKENZIE FUNK

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THE PENGUIN PRESS

New York

2014

THE PENGUIN PRESS
Published by the Penguin Group
Penguin Group (USA) LLC
375 Hudson Street
New York, New York 10014



USA • Canada • UK • Ireland • Australia New Zealand • India • South Africa • China

penguin.com

A Penguin Random House Company

First published by The Penguin Press, a member of Penguin Group (USA) LLC, 2014

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Photographs by the author

ISBN 978-0-698-15156-7

Version_1

For Jenny and Wilson.
(Mostly, she says, for him.)

CONTENTS

TITLE PAGE
COPYRIGHT
DEDICATION
INTRODUCTION

PART ONE

THE MELT

1. COLD RUSH: Canada Defends the Northwest Passage
2. SHELL GAMES: When an Oil Company Believes in Climate Change
3. GREENLAND RISING: An Independence Movement Heats Up
4. FATHER OF INVENTION: Israel Saves the Melting Alps

PART TWO

THE DROUGHT

5. TOO BIG TO BURN: Public Fires, Private Firefighters
6. UPHILL TO MONEY: Where Water Runs When It Runs Out
7. FARMLAND GRAB: Wall Street Goes to South Sudan
8. GREEN WALL, BLACK WALL: Africa Tries to Keep the Sahara at Bay; Europe Tries to Keep Africa at Bay

PART THREE

THE DELUGE

9. GREAT WALL OF INDIA: What to Do About the Bangladesh Problem
10. SEAWALLS FOR SALE: Why the Netherlands Loves Sea-Level Rise
11. BETTER THINGS FOR BETTER LIVING: Climate Genetics
12. PROBLEM SOLVED: Our Geoengineered Future

EPILOGUE: **MAGICAL THINKING**

PHOTOGRAPHS

ACKNOWLEDGMENTS

NOTES ON SOURCE

INDEX

INTRODUCTION

The contract had called for either a boa or an anaconda, whichever would best handle the crowds, and in the end the bankers got the latter: a green anaconda, six feet long and eighty-five pounds, which hung from the neck of a long-haired snake handler who lurked amid the exotic plants, next to the fake waterfall and the model dressed in “Amazonian” garb. Nearby were two scarlet macaws in wire cages, a Brazilian dance troupe, and a hut offering free organic smoothies. At the base of an eighteen-foot waterfall were giant koi, swimming in a pond: forty-five hundred gallons of warm, filtered water that would soon be dumped into the East River. The jungle was in a tent that was on the promenade at the South Street Seaport, in lower Manhattan. Thirty by sixty feet, suffused with a light mist, and heated to eighty degrees, the tent had white sides and a clear roof through which visitors could just make out the skyscrapers of Wall Street. It was cold outside, a typical thirty-nine-degree February day in early-twenty-first-century New York, so those beckoned inside by the street team—two models walking the streets to entice passersby to the event—had to quickly shed their jackets and scarves, so stark was the difference in temperature. Which was, of course, the point.

The stunt was a coming-out party, the most expensive stop on Deutsche Bank’s eighty-event “The Investment Climate Is Changing” road show held across the United States. In scale and imagination, it was rivaled only by the ski village and ninety-foot snowboard slope the bank had constructed a few weeks earlier along Rodeo Drive in Beverly Hills: chalets decorated with deer-antler chandeliers and wooden snowshoes, Deutsche Bank-branded ice sculptures, models dressed as snow bunnies, bottled water from Iceland, faux snow blown down from the roof of the Versace store, thirty tons of more realistic snow created by a wood chipper and a freezer truck full of ice blocks, and two pro snowboarders who would later complain that nobody had built them a proper jump. Together, the Manhattan and Beverly Hills events cost \$1.5 million, but they were carbon neutral, the bankers boasted, their greenhouse emissions offset by investments in a biogas project in India. At South Street Seaport, every attendee was given a certificate from the Carbon Credit Company as proof. The jungle party, which lasted three hours, produced 152 tons of greenhouse gases, which the average Indian would need three lifetimes to match.

Before a DJ set by the Brazilian Girls—a group with no actual Brazilians and only one girl—the bankers held a press conference. It was early 2008, and as the world was still reeling from a record melt in the Arctic and a scary film by Al Gore and a bleak report by the Intergovernmental Panel on Climate Change (IPCC), half a dozen major investment houses had launched global-warming-themed mutual funds. Deutsche Bank’s was the \$2.9 billion DWS Climate Change Fund. The jungle event was meant

to promote it. “Without taking a position on climate change,” a press release had explained, the “DWS Climate Change Fund is on the cutting edge of climate change investing.” The event’s objective was “not simply to show that climate change is happening,” said the executive Axel Schwarzer, “but that it creates related climate change investment opportunities.” Another release went further. “The debate around climate change is shifting away from cost and risk,” it said, “toward the question of how to capitalize on exciting opportunities.” Nothing as big and universal as climate change could be all bad. An ecological catastrophe was not necessarily a financial catastrophe for everyone.

Deutsche Bank’s chief climate strategist, Mark Fulton, worked in midtown in a building on Park Avenue, and I visited him there after the road show was done, clearing security and then riding a silent elevator to the twenty-seventh floor. His was a corner office, but it was small and cluttered with papers, and Fulton, an Oxford-educated Australian, looked as much scientist as capitalist. His desire to fight climate change was genuine. He told me he’d read the Club of Rome’s *Limits to Growth*—a neo-Malthusian take on the planet’s carrying capacity—as a schoolboy in the 1970s. “It made quite an impact,” he said. “They were talking about everything running out: ‘What are we going to do? We have to change the way we live!’” Instead of working for Greenpeace, which he’d considered after graduation, he became a stockbroker, then an analyst, and he’d eventually helped Deutsche Bank identify global warming as a “megatrend” that could generate profits for decades. “It’s always helped me, climate change, in my career,” he joked.

While the DWS fund invested most heavily in the technology to build a greener world—in wind power and solar power, in smart grids and smarter electrical meters—it had bought other stocks, too: companies that fit the portfolio not because they could help fight climate change but because the warmer the world, the less habitable it became, the bigger the windfall. They were a tacit recognition that we were already failing to stop climate change. There was the planet’s largest water company, Veolia, which manages pipes and builds desalination plants in seventy-four countries on five continents. Monsanto and Syngenta, ag-biotech giants that were tweaking genes to develop drought-resistant crops. And Viterra, a fast-growing agribusiness in temperate Canada. The fund also had shares of Duoyuan Global Water, one of the biggest water-treatment companies in desiccating China, and two fertilizer multinationals, Yara and Agrium. When I asked Fulton how the bank planned to capitalize on rising sea levels, he mentioned a small play in a Dutch dredging company, Royal Boskalis, which had just rebuilt an island in the Maldives inundated by the 2004 tsunami. “Where are you going to get seawall expertise but from the Dutch?” he asked.

Other climate investors told a similar story. They bought clean tech, green tech, the building blocks of the new, low-carbon economy—but they were also starting to hedge. In London, the Schroder Global Climate Change Fund was investing in Russian farmland—cheap, fertile soil suddenly made dear by milder winters and drought-fueled global food crises—and its manager was taking the logic a step further, buying stock in supermarket chains such as Carrefour and Tesco. “If climate change will be a negative for crop yields,” he told me, “then people will just have to spend more on food. Retailers are a clear beneficiary.” Across town, another fund manager explained why he was bullish on the reinsurers Munich Re and Swiss Re. “As natural disasters

start to be more common,” he said, “as climate change starts to cause flooding and droughts, insurance companies—reinsurers in particular—should get pricing power.” Because it allows insurers to jack up rates, “hurricane season is actually quite a positive thing.” A partner at a storied Wall Street investment bank showed me photographs of Ukrainian farmland and said his firm had tried to buy up “vast tracts” of it. Soviet-era collective farms had reverted to “pseudo-subsistence agriculture,” he said. “You could come to these guys and get thousands of hectares for a few bottles of vodka and, like, two months of grain. You could literally give them vodka and grain.”

In the run-up to successive climate conferences in Copenhagen, Cancún, Durban, and Doha, as everyone else was fretting about polar bears and electric cars, some fund managers worried I would misunderstand them—that I would mistake them for starry-eyed activists, that I would mistake theirs for just another green or socially responsible fund. “A lot of people think, ‘How do you invest in climate change?’ and essentially come up with one or two or maybe three areas, like alternative energy,” Sophie Horsfall, a manager of Britain’s F&C Global Climate Opportunities Fund, told me. “For us, well, there is an awful lot more to it. We have to separate out the ethical values. We have to move away from the environmental issues. We have to take a step back.” I must have looked puzzled. “We have to think about the reality of climate change,” she continued. “It is quite difficult, isn’t it?”

• • •

FOR DECADES WE have all known, at some level, about global warming. As a point of scientific inquiry it is decades old, first identified in the 1800s by John Tyndall and Svante Arrhenius, but as a source of popular anxiety and conversation it dates to the first sophisticated computer models of the early 1970s and the first World Climate Conference in 1979 and landmark congressional testimony by the NASA atmospheric physicist James Hansen in 1988. It has been around long enough to become a cliché—I thank it for the heat wave I’m experiencing in Seattle as I write this—and long enough to have birthed a newer cliché: the idea that we have so changed the planet with our engineering and our emissions that we now live in the Anthropocene, a new geologic epoch of man’s own creation. Long enough, certainly, for something to have been done about it. In the new millennium, which has brought us Al Gore’s *Inconvenient Truth*, Lord Nicholas Stern’s seven-hundred-page *Economics of Climate Change*, and a string of failed climate legislation and UN conferences, the warnings have been ever louder and more sustained. The atmospheric concentration of carbon dioxide, our principal contribution to the climate and the principal driver of warming, has only been rising. It is now 40 percent higher than preindustrial levels, higher than it has been anytime in the last 800,000 years. In New York’s Madison Square Garden, a seventy-foot doomsday clock, recently unveiled by Deutsche Bank, is tracking greenhouse-gas levels in real time: 2 billion metric tons added each month, or 800 a second, for a total of 3.7 trillion tons and counting. The ticker has thirteen red digits, but when you stare at it from Seventh Avenue, the last three are a blur. They’re spinning too quickly to see.

This book is about how we’re preparing for the world we seem hell-bent on creating. It’s about climate change, but not about the science of it, nor the politics, nor

directly about how we can or why we should stop it. Instead, it's about bets being placed on a simple, cynical premise: that we won't stop it anytime soon. It's about people, and mostly it's about people like me: northerners from the developed world—historically the emitter countries, as we're called—who occupy the high, dry ground, whether real or metaphorical.

I'm interested in climate change as a driver of human behavior—as a case study, the ultimate case study, in how we confront crisis. Warming will reshape the planet, and in broad strokes we already know how: Hot places will get hotter. Wet places will get wetter. Ice will simply melt. Poor, mostly tropical countries, those least responsible for the consumption that fuels the factories that produce the emissions that cause the warming, will be hit hardest, but wealthier, higher-latitude regions—Europe, Canada, the United States—are not entirely immune. The change is so vast, so universal, that it seems to test the limits of human reason. So it should not be surprising that the ideologies that led us here, those that have guided the postindustrial age—techno-lust and hyper-individualism, conflation of growth with progress, unflagging faith in unfettered markets—are the same ones many now rely on as we try to find a way out. Nowhere is humankind's mix of vision and tunnel vision more apparent than in how we're planning for a warmed world.

The idea that people are irrational has lately been in vogue. We can thank the global financial crisis for that. Behavioral economists have reminded us that the market, far from being a collection of fully logical individuals, is hostage to Keynesian “animal spirits,” the emotions, prejudices, impulses, and shortcuts that are part of nearly every human decision and every financial bubble—and part, no doubt, of our apathy about reducing carbon emissions. In the United States, nearly 98 percent of the federal climate-research budget goes to the hard sciences, which have produced mounds of evidence for global warming—enough to make a believer of anyone who gives it an honest look—and produced increasingly refined computer models predicting an increasingly dire future. One recent prediction, from MIT, is of a median warming of 5.2 degrees Celsius by 2100 if we don't curtail emissions—a temperature spike that campaigners believe could entirely melt the polar ice cap in summertime, turn parts of Central America and the southern United States into a dust bowl, and wipe island nations off the map. The remaining 2 percent of the federal research budget goes to social scientists, such as those with Columbia University's Center for Research on Environmental Decisions, who probe what may now be the most important question: If we know the risks, why aren't we doing anything? The center's director, Elke Weber, suggests that at both levels where humans make their decisions—emotional and analytical—there are roadblocks. The emotional block: What we don't see doesn't scare us. “The time-delayed, abstract, and often statistical nature of the risks of global warming does not evoke strong visceral reactions,” Weber writes. At the analytical level, there is, along with the tension between individual and systemic risk—an apparent tragedy of the commons—something economists call hyperbolic discounting. It goes like this: Offer to give someone either \$5 today or \$10 next year, and he'll probably take the \$5.

Among many activists, politicians, and scientists, the assumption is that climate change now suffers mainly from a PR problem: If the proper nudges can be found or the reality of it finally made visceral, the public will take action. Unspoken and

scarcely examined is a second, much bigger assumption: that “taking action” means trying to cut carbon emissions. That taking action will take a certain shape: Green roofs. Carbon caps. Green cars. Solar panels. Footpaths. Forests. Fluorescent bulbs. Bicycles. Insulation. Algae. Inflated tires. Showers. Clotheslines. Recycling. Locavorism. Light-rail. Wind farms. Vegetarianism. Heat pumps. Telecommuting. Smaller homes. Smaller families. Smaller lives. We hope our collective fear of global warming will push us inevitably toward collective behavior. But what if the world as we know it goes on even as the Earth as we know it begins to disappear? There’s another possible response to melting ice caps and rising sea levels, to the reality of climate change—a response that is tribal, primal, profit-driven, short-term, and not at all idealistic. Every man for himself. Every business for itself. Every city for itself. Every country for itself. There’s the possibility that we take the \$5.

• • •

SPEND AN AFTERNOON in the right part of the Arctic, perhaps in the company of a Russian or an Icelander or an oil executive, listen to the plans being hatched, and you can experience anew the carnival atmosphere of Deutsche Bank’s jungle tent. The Arctic was where I did the first reporting for this book, and it was where I caught my first whiff of giddiness about climate change, of opportunism amid environmental crisis. There was oil under the ice. There were new shipping lanes emerging over the pole. There were strawberries sprouting in Greenland. The high north was the first place where warming had become not an invisible menace but a daily reality, thus the first place where I could actually witness people’s reactions to it. I began traveling the rest of the globe with the same intent—to document present-day preparations for a warmer world, to observe what was happening rather than theorize about what could happen.

Global warming’s physical impacts, the impetus for the plans and projects I investigated, can be separated into three broad categories: melt, drought, and deluge. Accordingly, this is a book in three parts. Part One, “The Melt,” is set against the liquefaction of the world’s ice sheets and glaciers, a process that is only accelerating: In recorded history, the Northwest Passage and the Northeast Passage have never, until today, become ice-free and thus open to commercial shipping, and the Arctic ice cap has never been smaller than it was in the summers of 2007, 2008, 2009, 2010, 2011, and especially 2012, when 4.57 million square miles, an area larger than the United States, melted away. Part Two, “The Drought,” discusses the large-scale reordering of our planet’s hydrology such that rain falls at different times, in different places, and deserts appear where there were none. In some places, drought is a result of melt; mountain snowfields and glaciers are the planet’s best natural water reservoirs, and they are dramatically receding. That the drought is already beginning is evidenced not by specific events but by a pattern of them: wildfires in Colorado, water woes in northern China, desertification in Spain, food riots in Senegal, and the fact that to describe the recent state of Australia’s breadbasket, the Murray-Darling basin, the term “drought” was discarded in favor of the more permanent-sounding “dryness.” Part Three, “The Deluge,” addresses what is generally our most distant concern, decades if not centuries out—the rising seas, surging rivers, and superstorms that will threaten

island nations and coastal cities. But it is hastened as parched cities drain their aquifers and begin to sink, accelerated as Greenland's ice cap melts into the sea. And after Hurricane Sandy and Typhoon Bopha and failure after failure to cut global carbon emissions, it is not entirely distant.

To explore these changes in order—from melt to drought to deluge—as I broadly did, with some exceptions, in my travels around the globe, is to go from opportunism to wagon circling to open desperation. The expansionist exuberance of the Arctic petroleum rush, which has men running around like Elizabethan invaders, claiming virgin territory, fades into the grim free marketeering of a Malthusian world without enough water, then into the bunker mentality of sea-level rise and hurricanes, which could be what finally makes climate change personal for many Americans—and against which long-shot technology is viewed as our only escape hatch. There is no single response to the effects of global warming, even if we do seem to fall back on a finite set, but as I traveled, I found a consistent theme: I met hundreds of people who thought climate change would make them rich. In the six years I spent reporting this book, visiting twenty-four countries and more than a dozen U.S. states (and flying so often that I caused far, far more than my share of carbon emissions), I met profiteers, engineers, warlords, mercenaries, vigilantes, politicians, spies, entrepreneurs, and thieves—people seeking to come out ahead in a new, warmed world. They were universally kind and hospitable to me, and nearly all, driven by ideology, fear, or hard-nosed realism—or all three—thought they were doing the necessary thing. In six years, I never met a bad person.

When you're on the high ground—wealthy enough, northerly enough, far enough above the sea—global warming is not yet the existential threat that it is for an Egyptian or a Marshall or Staten Islander. It's a shorter ski season, a more expensive loaf of bread, a new business opportunity. We can afford the desalination plants; we can afford the seawalls. Many of the world's existing imbalances seem only magnified by climate change, and they may be magnified all the more by how we respond to it. The technical term for trying to prepare for an altered planet is “adaptation.” (To try to cut emissions is known as mitigation.) One of the few tangible results of the 2009 and 2010 climate conferences in Copenhagen and Cancún was a pledge by emitter countries to help poorer countries adapt. But new climate funding is already falling short of the pledge: so far, \$2 billion to save the rest of the world, which is at least \$8 billion less than it could cost to build a proposed storm-surge barrier to protect New York City from the next Sandy.

It would be a mistake to suggest that every plan and project described in this book was born solely, or even principally, in response to climate change. Arctic oil is attractive for many reasons, not least because there's less and less oil everywhere else, and what remains is often in hostile countries (Iran, Venezuela, Sudan) or recent conflict zones (Iraq, Nigeria, Libya). Water markets have boomed in Australia and California thanks in large part to the historic oddities of their water laws and the decision, whether foolish or brave, to turn emptiness into farmland, deserts into paradise. African refugees crowding southern Europe's detention camps have often fled more immediate threats than the expanding Sahara. Genetic engineers racing to build supernaturally perfect corn see climate change as just one more excuse for their efforts. Weather modifiers have tried to make rain and tame hurricanes for a

generation. The twenty-one-hundred-mile fence that India is building around Bangladesh is not all about sea-level rise, not hardly: India also doesn't much like Bangladesh, and its emigrants have long been a source of irritation. It is as difficult to attribute human action to a single climatic cause as it is to attribute today's weather report—or one bad wheat harvest—to long-term climatic shifts. But global warming is the thread that ties these stories together, and it's a window into our collective state of mind. I've tried to keep rooted in the present, so if there's a glimpse of the future in these pages, it's only because we're the ones making it. To the increasingly urgent question "What *are* we doing about climate change?" this book is meant to be an answer.

PART ONE
THE MELT

It is natural to expect that opinions were very varied when the news spread that the Arctic region was going to be sold at auction for the benefit of the highest and final bidder. . . .

To use the Arctic region? Why, such an idea could “only be found in the brain of a fool,” was the general verdict.

Nothing, however, was more serious than this project.

—Jules Verne, The Purchase of the North Pole, 1889

ONE

COLD RUSH

CANADA DEFENDS THE NORTHWEST PASSAGE

On the first full day of the sovereignty operation, the captain slowed the frigate and we took out the machine guns and sprayed the Northwest Passage with bullets. It felt pretty good. It was foggy out, and the unpolluted water boiled as we polluted it with lead. There was no life we could see and few waves. The wind was cold, the Arctic Ocean a drab green. There wasn't any ice. But if there had been ice, we would have shot it, too.

The guns were C7s—American M16s but rechristened, like many Canadian weapons, with a patriotic *C*—and most of the shooters were camo-clad teenagers from Quebec's celebrated 22^e Regiment, who are known as the Vandoos, from *vingt-deux* (twenty-two). The Vandoos lined up three in a row on the back deck, each of them held in place by a sturdy navy man, and fired away. They went from semiautomatic to fully automatic and shot more. They switched to pistols and then shotguns and shot until the deck was littered with shells. When they finished, they kicked the shells into the sea. There were journalists on board, and the Arctic was melting, and the Canadians—who now had a new, northern coastline to develop and defend—were trying their hardest to be fierce. The world had to understand that they were ready to fight for whatever riches the retreating ice revealed.

The frigate was named the *Montreal*. It was the length of two city blocks and painted warship gray, packed with two dozen torpedoes and nearly 250 people. There were sailors, Vandoos, and Mounties. There were Canadian wire-service reporters and photographers from at least two in-flight magazines. There were Inuit dignitaries and observers from Nunavut Tunngavik Incorporated, the pseudo-governmental Inuit corporation that had negotiated the 1999 creation of its people's own 800,000-square-mile territory, Nunavut. Our cruise speed was 15.5 knots. Our fuel stores were at 125 percent. With diesel taking the place of water in the auxiliary tanks, our showers were capped at two minutes. We were steaming north, farther north than the Royal Canadian Navy had gone in decades.

The Arctic held two main prizes: petroleum and new shipping lanes. An estimated 22 percent of the world's untapped deposits—ninety billion barrels of oil and 1,670 trillion cubic feet of natural gas, according to the U.S. Geological Survey—is thought to be hiding in the high north, some of it in territory that does not yet belong to any nation. The less ice there is, the more petroleum there is within reach, and the more pressure there is to stake a claim. Likewise, the less ice there is, the more the storied

Northwest Passage—a long-sought, long-frozen-over shortcut between the Atlantic and the Pacific—becomes a viable alternative to the Panama Canal, saving potentially shippers leaving Newark or Baltimore for Shanghai or Busan some four thousand miles and hundreds of thousands of dollars in transit fees and fuel costs.

Canada owns the land on both sides of the Northwest Passage, but much of the world, particularly its customary ally the United States, does not agree that it owns the waterway itself. Canadians were tired of being pushed around by their more populous neighbor—of being “condemned to always play ‘Robin’ to the U.S. ‘Batman,’” as American diplomats would put it in a 2008 cable released by WikiLeaks. At stake up here was national pride, not just money or national security. To kick off this show of force, called Operation Lancaster, conservative prime minister Stephen Harper himself had made the long journey to Iqaluit, the former U.S. military base that is now the capital of Nunavut. He had arrived bearing promises of new heavy icebreakers, a new Arctic warfare and training center, a new deepwater port, and a new network of undersea sensors and aerial drones. Now, as his Vandoos and Mounties moved north, he was putting boots on the ice.

There had been sovereignty operations before, including Nunavut (Inuktitut for “the land is ours”) in 2006 and the previous year’s Exercise Frozen Beaver, when Canadian troops helicoptered to Hans Island—a bean-shaped, half-square-mile rock near Greenland claimed by both Denmark and Canada—and planted a supposedly windproof steel flag and flagpole that the wind toppled almost immediately. But Lancaster was the largest such operation to date, the first to take advantage of retreating sea ice, and it was occurring on the hundredth anniversary of the Northwest Passage’s first crossing (which was by a Norwegian, though no one dwelled on that). Its stated goal was to “project a credible size military force over a broad area of the Eastern Arctic.” It would last twelve days in all. The *Montreal* would lead a flotilla of two navy warships and two coast guard icebreakers into Lancaster Sound, the eastern entrance of the passage, and patrol back and forth as the skies buzzed with Aurora surveillance planes and Griffon helicopters. Meanwhile, the Vandoos—accompanied by Inuit reservists, there to ensure that no one was eaten by polar bears—would take the smaller ships to shore and set up observation posts on both sides of the sound. To the north, on rocky Devon Island, would be Observation Post 1. To the south, on glaciated Bylot Island and the adjacent Borden Peninsula, would be Observation Posts 2 and 3. The troops would hold the high ground for most of a week, scanning the Northwest Passage for invaders.

This would all be preceded by a display of Canadian resolve: a mock interdiction. After watching the machine guns fire and the Maple Leaf flag flutter, I strolled up to the bridge and stood next to the *Montreal*’s commanding officer. He and his crew had donned green helmets and green flak jackets. The radio crackled, and a Canadian approximation of the voice of a California surfer filled the bridge. It was the supposed captain of the *Killer Bee*, which in actuality was the *Goose Bay*, a 150-foot Canadian coastal-defense vessel that the war gamers had decided would be a rogue “American” merchant ship starting an unauthorized transit of the Northwest Passage.

The *Killer Bee* was four miles away in the fog, sailing a course that would intersect with ours in an estimated fourteen minutes and forty-two seconds. It would not say where it was going. It would not say what was in its hold. “Merchant vessel *Killer*

Bee, what is your cargo?” our radioman asked. “This is Warship 336. Again, what is your cargo?” The *Killer Bee*’s answers were brief, rude, believably American in their tone save for the occasional slipup: “We’re about forty miles off the coast, which constitutes international waters. Are you sure you have the authority to be questioning me out here? Can you just tell me again why I’m being asked these questions? You guys are the almighty Canadian government, so I’m sure you can access this sort of information somewhere else.”

The *Montreal* passed a message to the colonel running Operation Lancaster, asking for clearance to send over a boarding party and, if necessary, to initiate “disabling fire.” The sailors on the bridge peered into the mist off our port side. We informed the *Killer Bee* that we would be boarding it, and its captain replied that he wouldn’t be “too down with that.” The engine churned. We began to close the gap: seven hundred yards, six hundred yards, five hundred yards. The ship appeared, and we aimed our .50-caliber machine gun at it. “Bullying your way around the ocean is not a way to foster cooperation between our two countries,” the voice told us. We commanded the *Killer Bee* to remove all personnel from its top decks, and our gunners directed a barrage of tracer fire a thousand yards off its bow. The smell of gunpowder wafted through the bridge. The next barrage was five hundred yards off the bow. Finally, our 57-millimeter cannon swiveled toward the *Killer Bee*. There were five loud booms in quick succession, five puffs of smoke, and then, seconds later, a sixth round. The ocean in front of the *Killer Bee* erupted. Its captain relented. “I thought Canada was a nation of peacekeepers,” whined the faux American.

For the next five hundred miles, we saw only water and fog and an occasional glimpse of the chutes and pinnacles of Baffin Island’s peaks. It wasn’t until 10:00 a.m. on the operation’s fourth day that a much-awaited announcement came over the loudspeaker: icebergs ahead. We rushed to the port-side deck where the officers normally gathered to smoke. We were at seventy-two degrees north, and there were three of them: two- and three-hundred-foot giants that towered over the frigate. The icebergs’ walls were riven by small waterfalls, and chunks of ice were falling off into the sea. The bergs were drifting south toward the Atlantic, bound for warmer waters, where they would soon melt into nothing. The Vandoos leaned over the railing and snapped photographs.

• • •

IT WAS THE SUMMER OF 2006, and drought-crazed camels would soon rampage through a village in Australia, a manatee would swim past Chelsea Piers in New York City’s Hudson River, and the Netherlands would announce that its famous Elfstedentocht ice-skating race might have to be postponed forever. Armadillos were reaching northeast Arkansas. Wolves ate dogs in Alaska. Fire consumed fifty million acres of Siberia. Greenland lost a hundred gigatons of ice. The Inuit got air-conditioning units. The polar bear lurched toward the endangered-species list. India’s Ghoramara Island was mostly lost to the Bay of Bengal, Papua New Guinea’s Malasiga village was mostly lost to the Solomon Sea, and Alaska’s Shishmaref village decided to evacuate before being lost to the Chukchi Sea. Canadian scientists reported that the forty-square-mile Ayles Ice Shelf had broken off Ellesmere Island and formed a rapidly melting island of

its own. A European satellite showed a temporary crack in the ice pack leading from northern Russia all the way to the North Pole. The National Oceanic and Atmospheric Administration would declare that winter the warmest since it began keeping records, which was in 1880. The Intergovernmental Panel on Climate Change would announce that eleven of the previous twelve years were the warmest in human history.

In retrospect, this was the moment that we began to believe in global warming—not in the abstract science of it, which most could already passively accept, but in the fact that there were money and power to be won and lost. Skeptics would continue loudly doubting the overwhelming scientific consensus, but they were a smoke screen. For those who considered climate change's strategic rather than ideological impacts—militaries, corporations, the rare politician—it had become time to grapple with the consequences. There would be winners. There would be losers. The process of determining who was who was getting under way.

Great Britain had recently asked its chief economist, Sir Nicholas Stern, to conduct a review of global warming's likely effects on world markets. His findings were dire: The cost of unchecked greenhouse-gas emissions would be the equivalent of losing 5 percent or more of global GDP a year, every year, forever. In tropical Africa and South America, crop yields would drop dramatically. In South and East Asia, hundreds of millions of people and trillions of dollars of assets would be threatened by rising seas. "What makes wars start?" Britain's foreign minister, Margaret Beckett, asked the UN Security Council in 2007. "Fights over water. Changing patterns of rainfall. Fights over food production, land use." According to Lord Stern, the world was on the brink of an upheaval on the scale of the two world wars and the Great Depression.

But the future did not seem universally dark. At the margins of the crisis, some were already seeing opportunity, especially in the wealthy nations that were causing climate change in the first place. At least in the near term in most of Europe, Russia, Canada, and America, rain will still fall, growing seasons will extend, and some agriculture could expand, bolstered by our emissions. Carbon dioxide is a key building block for plant growth. All else being equal—though in few cases will all else be equal—the higher the atmospheric concentration, the higher the yields.

Farther north, in the Arctic, the ice albedo feedback effect—the fact that sea ice, which reflects 85 to 90 percent of solar radiation, melts to become seawater, which absorbs all but 10 percent of radiation—would help keep temperatures climbing at twice the global rate. Northern economies seemed poised to grow at least as rapidly. Canada's farmers already had two extra growing days a year, and studies said its Athabasca tar sands might someday be accessible from the north, via the Mackenzie River. Under Stephen Harper, a country many Americans considered well-meaning to the point of naïveté was becoming one of the villains of international climate conferences. Canada was a party to the Kyoto Protocol, a weak 1997 treaty that mostly excluded big emitters like China and the United States but nonetheless remains the world's first and only binding international agreement on greenhouse gases. Yet Canada would be overshooting its Kyoto targets by 30 percent by the time it abandoned the treaty in 2012—just before another northern economy, Russia, also made its exit. One could blame Canada's climate about-face on its reliance on carbon-intensive tar sands. But it is also unclear that climate change is all that bad for Canada.

The \$49 million grossed by Al Gore's *Inconvenient Truth* might have been global

warming's first true financial success story, but as the *Montreal* entered the Northwest Passage, the new mentality was taking hold. Reports by Citigroup, UBS, and Lehman Brothers advised investors on how to wring a buck out of global tailspin. Citigroup's report *Climatic Consequences: Investment Implications of a Changing Climate*, released in January 2007, was particularly helpful. It highlighted investment opportunities at seventy-four companies in twenty-one industries in eighteen countries, including Aguas de Barcelona (drought-afflicted Spain's "leader in water supply"), Monsanto (drought-resistant crops), and John Deere (more tractors needed in America as drought wiped out Australia's wheat exports). It showed a graph of the six top natural-gas-producing countries in the world. Four of them—Russia, the United States, Canada, and Norway—were Arctic nations.

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MY BUNK MATE on the *Montreal* was a man I'll call Sergeant Strong, a tall Canadian in his forties who had a thick brown mustache and a runner's build and wore a dark beret with a gold crest. He had killed people in the Balkans, Afghanistan, and places he would not specify, and every time I pulled out my camera, he stepped out of view. He did not want me to use his real name. He was a patriot and a lifelong soldier, and recently he'd become a reporter for Canada's *Army News*. He roamed the ship with a pair of Nikons slung from his shoulders. We first met on the back deck, near the helicopter hangar, and he immediately asked who I thought owned the Northwest Passage. I said I wasn't sure. "It's ours," he told me. "It's fucking ours." Then he shared his solution for the territorial dispute over Hans Island. "We should just nuke Denmark," he said. He was kidding, of course. Canada has no nuclear weapons. His real solution was more typically Canadian, and it revealed him as a believer in the basic boots-on-the-ice premise of Operation Lancaster: If Canada backed up its Arctic claims with a physical presence, the world would recognize them. "Just put a trailer on the island," he said. "Two guys, two months at a time. Give them TVs and VCRs. And guess what: Problem solved."

The sergeant had a partner, Master Corporal Bradley, a giant videographer with whatever the opposite of a Napoleon complex is. Bradley's mustache was gray and waxed into dueling barbs, and he wore noise-canceling headphones even when he wasn't filming. He walked like a hunchback through the bowels of the *Montreal*, constantly hitting his head on doorways. The three of us, it turned out, would be part of the landing team forming Observation Post 1 on Devon Island. We would be joining eight Vandoos and four Canadian Rangers—Inuit reservists outfitted with red cotton hoodies—to go ashore at Dundas Harbor, a shallow fjord where the Royal Canadian Mounted Police had manned an outpost in the 1920s. Back then, two constables had been lost to self-inflicted gunshots to the head: the first, a suicide; the second, an apparent walrus-hunting mishap.

Two days before our "insertion," which is what everyone insisted on calling our mission to Devon, we were allowed to take a tour of the *Montreal's* operations room—a cave of damp air lit only by radar and sonar screens and low red lights. Inside we met the ship's underwater-warfare officer. "Could you detect a passing submarine?" I asked. He could not. The ship couldn't drop sonar rays in the water without NATO

permission. “They’d wonder why we were asking,” he said. “And if we did detect something, we’d say, ‘Hey, we found your sub,’ and the Americans would say, ‘No you didn’t,’ and we’d say, ‘Yes we did.’ It’s a touchy subject.” I asked about the relative size of the two navies. “The Americans, jeez, I can’t count how many ships they have. They have sixty thousand people working in Norfolk alone. On one base. That’s as many as we have in our entire armed forces. They have massive fleets. Massive. And we’re obviously, you know, small.” Our tour guide interjected, “But we can punch above our weight class.” The officer agreed. “Yeah, we punch above our weight class.”

One deck below the ops room was the lower-ranks mess, and I went there one afternoon to hear Commissioner Ann Meekitjuk Hanson, the formal head of Nunavut, address the troops. She told them about her childhood speaking only Inuktitut, her forced relocation to Toronto for schooling, and her Canadianized life in journalism and politics. “I have to disabuse southerners of their igloo notions,” she said, “and explain that there’s more to us than drumming and throat singing.” A sailor named Roberts, one of perhaps five black people on the entire ship, asked how climate change was affecting the Inuit way of life. The commissioner said that autumn was getting noticeably later, and that they were having difficulties forecasting weather and ice conditions; now there were only six seasons rather than the traditional eight. She showed us slides of her homeland and put a cassette into a boom box to play some throat-singing music for us.

After the music stopped, I walked down the hall and found Sergeant Strong once again promoting his plan for the Hans Island dispute with Denmark. “It could be something as simple as putting a couple of guys up there with a trailer,” he told a reporter from one of the in-flight magazines. “How much would that cost? The problem would just go away.”

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THAT OCTOBER, I traveled to Vancouver to meet the legal scholar Michael Byers, the former director of Duke University’s Canadian Studies Program and a widely respected expert on Canadian security and sovereignty. Byers, who was a young-looking forty years old and wore the same two days’ worth of beard he seemed to display every day, had recently returned home, surrendering his U.S. green card to a border guard in a burst of patriotism. He had taken a position at the University of British Columbia, and I was invited to sit in on his graduate seminar on climate change, a ten-person class held in a corner room with tall windows looking out on tall fir trees. When I walked in fifteen minutes late, a lanky student named Ryder McKeown was delivering a PowerPoint presentation called “Climate Change and National Security.” He wore jeans and glasses and Puma sneakers that happened to be red, white, and blue.

“Given the choice between starving and raiding,” one of McKeown’s slides read, “people raid.” He wasn’t talking about refugees from the tropics—at least not just them. The United States has a worsening water shortage, he said, and Canada has 20 percent of the world’s freshwater. He described “fantastic schemes” to export it across the border in bulk, including NAWAPA, the North American Water and Power