



SPICE

WORLD



ILLUSTRATION BY MARK PERNICE



AS THE LATEST TAKE ON *DUNE*
HITS THE BIG SCREEN,
WE TRACE THE LEGACY OF
FRANK HERBERT'S COMPLEX,
PRESCIENT MASTERPIECE.

***DUNE*, FAMOUSLY, IS** an unfilmable piece of work. It has four appendices and a glossary of its own gibberish, and its action takes place on two planets, one of which is a desert overrun by worms the size of airport runways. Lots of important people die or try to kill each other, and they're all tethered to about eight entangled subplots. But as Denis Villeneuve, the director of the latest attempt to put *Dune* on the screen, says of the undertaking, "We are bound to try to do the impossible." ¶ Frank Herbert's 1965 novel is more than just a story of daunting scale. What people mean when they say it's unfilmable is less, perhaps, that it *can't* be filmed and more that it's begging not to be. ¶ *Dune* is a space opera, an allegory for ecological disaster, a disquisition on power—and an unending source of inspiration for all manner of extraliterary pursuits. In the half century since the novel's debut, its ideas and philosophies have shown up in everything from cybersecurity and modern spirituality to views on warfare. Its meaning no longer lies solely on the page; it lives in how people have consumed and transformed it, like a sandworm moving beneath the culture. Villeneuve's movie is merely one eruption. Here, we celebrate some of the rest. And, OK, fine—we'll deconstruct a stillsuit too. We're still nerds, after all. —THE EDITORS



LINES IN THE SAND

THE SECRET
SCI-FI ORIGINS OF
BURNING MAN

BY JASON KEHE



I

0 5 7

IT HAPPENED ONE NIGHT, sometime between 2000 and 2005. She swears it happened, but she can't be more specific about the timing than that. ¶ What Summer Burkes does remember is what she saw. She was deep in the desert with a few friends, wandering deeper—no life in sight. Then, at some point, some dark and indeterminate hour, she came upon an abandoned camp. There were cargo tents. And a lookout tower, which she climbed. At the top was a small platform; on it a TV set, glitching, and some dusty old comms equipment. Burkes listened to a transmission playing on loop. It told her where she was: the planet Arrakis. It also told her the reason nobody was there: They'd all been eaten by a sandworm. "That one made my hair stand on end," Burkes says. She ran back down, scanning the area, frantic, for signs of the worm. ¶ The danger was not, strictly speaking, real. Burkes was at Burning Man, the conflagrant annual con-fab in Nevada's Black Rock Desert. And the ghost camp, she now believes, sitting in the present-day comfort of her home in Northern California, was an art installation designed to transport nerdy Gen Xers like herself to Arrakis,

ILLUSTRATION BY CALVIN SPRAGUE

the setting of Frank Herbert's *Dune*. It's a planet covered in a scorching desert-sea, its tidal sands undulating with the subterranean squirmings of giant, sightless worms. Walk across its surface in too even, too lifelike a pitter-patter and the creatures will hear you, surge skyward, and strike.

Is that what Burning Man is all about? Role-playing scenes from your favorite fantasies, with a frightening dash of Herbertian horror? You'd be forgiven for thinking not. Over the years, the event—expected to return to the desert in 2022 after a two-year Covid hiatus—has come to represent a kind of counter-cultural city on a hill, founded on druggy West Coast woozeries and lovey-dovey principles of living, a radical weeklong social experiment bolstered by a gift economy. “A load of hogwash,” says John Law, one of its founders. He's a little peeved, because the bigger Burning Man gets, the more its most ardent devotees seem to misrepresent its geeky beginnings. “In reality,” he says, “pop culture was a much larger influence.” Though almost nobody talks about it, the origin of Burning Man was *Mad Max*. It was *Lawrence of Arabia*. And it was, very crucially and in a way that has never been properly acknowledged, *Dune*.

B

BUT BURNING MAN began on a beach, you say. Very good: In 1986, Larry Harvey and co. set fire to an 8-foot-tall wooden doll on San Francisco's Baker Beach and made such memorable merit that they were compelled to do it all over again the next year. Then the year after that, and the next, until the party got so rowdy the police shut them down. So Harvey called up Law, whose punkish, sci-fi-obsessed prankster buddies at the Cacophony Society had an idea: Let's take it to the desert. The year was 1990, the beginning of Burning Man proper. “We drew a line in the dirt and stepped across it, and it was entirely transformational,” Law recounts in *Spark*, one of many Burning Man documentaries.

As early as that first year “on the playa”—Burner-speak for Black Rock—the *Dune* obsessives in the crew suggested everyone build mock stillsuits, a reference to the form-fitting bodywear that recycles precious fluids and keeps Arrakis' desert-dwelling Fremen alive when they venture beyond the safety of their mountain villages, known as sietches. “They ended up with a bit of a compromise requiring less costuming work, and covered their entire bodies in playa mud,” Law says. In later years, attendees would bring their own Duneries to the proceedings. “I want to get together a group that would be interested in building a Fremen sietch on the playa,” one announced on the ePlaya message board in 2007. Another Burner, in 2005, called the decommissioned ambulance he rode in “the worm.” For

0 6 8

years, Burkes and an artist ex-boyfriend fantasized about building a giant worm bursting out of the playa sand.

Burkes started going to Burning Man in 1998, back when there were no LEDs and everything looked just a little grungier, a little more Arrakeen. “All fire and dust and metal,” she says. She was a music and nightlife writer for the *SF Bay Guardian* at the time; after reporting a story about Burning Man's Department of Public Works, she immediately joined it. They're the crew responsible for building up, and then tearing down, the event's physical infrastructure each year, so for them, some of the most meaningful parts of Burning Man take place when the desert is mostly empty. On the team, Burkes eventually settled into the role of dispatcher—“the MC of everyone's radio traffic, the all-seeing eye,” as she puts it. One of her first innovations on the job was to come up with a way of identifying the precise moment when the public phase of each Burning Man's life cycle had really begun. “Before the event, it's so nice and quiet and dark,” she says. “Then all the loud, bright, blinky people get there, and the first sign is the techno vibrating the floor of the desert. You can feel it in your sternum.” That was her cue. She'd click on her walkie-talkie and announce to the staff: “WE HAVE WORMSIGN.”

For the members of her crew, that moment was always a bit of a letdown, and only became more so as Burning Man got brighter and blinkier over time. “We love the desert because of its transformative properties,” she says. “It's so quiet it presses on your ears—until there's wormsign.” Plus, Burkes adds, there's an underground river that courses beneath Black Rock, and she imagines that the critters in it probably resent that four-on-the-floor beat. “There's something that makes sense in the desert about walking with uneven steps and not alerting the sand-worms to your location,” she says.

LEDs and extra-obnoxious ravers weren't the only changes that marked Burning Man's evolution. The most obvious one, which Burkes is frankly tired of talking about, is the influx of tech workers and their showy CEOs. At this point, practically everybody in the Bay Area has been or knows somebody who's been to Burning Man. There's a professor at Stanford who studies the event's influence on software development. In Elon Musk's infamous formulation, Burning Man *is* Silicon Valley. Regardless of your feelings about that, its hypocrisy or at least hilarious irony, consider this: It all goes back to *Dune*.

Frank Herbert's story is one any techish Burner will recognize on a cellular level: A boy-genius wanders into the desert, does a lot of drugs, and finds Buddhist clarity. Though Herbert didn't care much for computers, and set his epic in a far future devoid of them, he nonetheless used the word *computation* to describe the superhuman abilities of his hero, Paul Atreides: Paul “saw the avenues ahead of them on this hostile planet,” Herbert wrote in *Dune*. “He focused his prescient awareness, seeing it as a computation of most probable futures, but with something more, an edge of mystery—as though his mind dipped into some timeless stratum and sampled the winds of the future.” Sounds a lot like the so-called flow state so fetishized by Silicon Valley's coding elite.

IN ELON MUSK'S INFAMOUS FORMULATION, BURNING MAN IS SILICON VALLEY. REGARDLESS OF YOUR FEELINGS ABOUT THAT, ITS HYPOCRISY OR AT LEAST HILARIOUS IRONY, CONSIDER THIS: IT ALL GOES BACK TO *DUNE*.

M

MEN HAVE BEEN searching for, and occasionally finding, themselves in deserts since at least the dawn of recorded history. To nonnatives, the landscape—its emptiness and deprivation—offers the possibility of spiritual transformation. Herbert, born in a temperate corner of Washington, was no exception. He was 36 years old and working as a journalist when he made his way to a miniature Sahara in the state of Oregon: a dramatic stretch of coastal sand dunes just outside the town of Florence. An international group of conservationists and ecologists had gathered there to study the destructive power of these wind-driven landforms, which threatened not only Florence but cities from Chile to Libya to Israel. Herbert proposed to write a magazine story on the subject. “These waves can be every bit as devastating as a tidal wave in property damage,” he wrote in a letter to his agent, Lurton Blassingame, “and they’ve even caused deaths.”

Bless Blassingame. He thought the story of advancing sands “fairly limited in appeal,” sending Herbert spinning off to other-worldier realms. Convinced a novel might better accommodate his new ecological obsessions, he spent the next eight years writing and refining a 188,000-word epic set in a mythic, monstrous desert. It’s fair to call the appeal of *Dune*, since its publication in 1965, fairly unlimited.

Roughly a 10th of Earth’s surface is desert; on Arrakis, of course, the proportion is bumped up a full order of magnitude, to a (not so) cool 100 percent. That’s science fiction for you: the enlargement of a remote extremity to planet-size proportions, in

order “to define,” in the words of Bill Ransom, an old friend and collaborator of Herbert’s, “what it is to be human.” As to what sorts of humans might be found in the fiery furnace of Arrakis, Herbert looked far beyond his own desert wanderings for an answer, to the life of T. E. Lawrence, the British warrior-poet who stirred up Arab resistance to the Turks during World War I and who, in a dizzying circularity, also influenced the founders of Burning Man. “This historical event,” wrote Herbert’s son Brian, in an introduction to *Dune*, “led Frank Herbert to consider the possibility of an outsider leading native forces against the morally corrupt occupiers of a desert world, in the process becoming a godlike figure to them.” Or, as Mr. Dryden puts it in the ’62 Lawrence biopic: “Only two kinds of creatures get fun in the desert: Bedouins and gods.”

That’s what deserts do, in stories: They make prophets of men. All the greats, from Moses to Mad Max, have survived the heat, and to their number *Dune* added another M-name: the Mahdi. Arabic for “guided one”—the Mahdi is an end-times savior in Islam—it’s what the native Fremen call their new leader, Paul.

When Harvey, Law, and the rest of the first-gen Burners drew that line in the sand of Black Rock Desert, they were playing Paul Atreides. They were having fun, but they came out immortals. Thirty years later, people follow them still, seeking meaning, and perhaps a touch of godliness, or else of “computation,” every time they wander into the desert. Which is less a desert, these days, than a “blinky adult wonderland,” as Burkes puts it. She stopped going to Burning Man in 2016. “Eighteen, 19 years was enough,” she says. “There’s no rain on Arrakis.”

Nor is there much in the way of peace. Herbert didn’t write just one *Dune* book, a fact perhaps forgotten by some of its more casual fans. He wrote six, and Paul doesn’t remain the hero of them for long. Soon after his triumph on Arrakis, the Mahdi leads a 12-year intergalactic jihad that claims the lives of 60 billion people. That’s eight Earths’ worth. Sometimes, a man goes into the desert, becomes a messiah, and ends up a goddamn monster. **W**

JASON KEHE (@jkehe) is a senior editor and culture critic at WIRED. He wrote about Amazon’s sci-fi efforts in issue 29.09.

HOW TO MAKE A

STILLSUIT

ILLUSTRATION BY VIOLET FRANCES / BCD



Mask Up

In the desert, grains of sand can pelt the face at skin-shredding speeds. Herbert imagined a mask that covered all but the eyes—they're protected by hoods—and filtered out sand and other particles in the air. Though West's version didn't perform the latter function, it did protect the actors from flying grit on set.



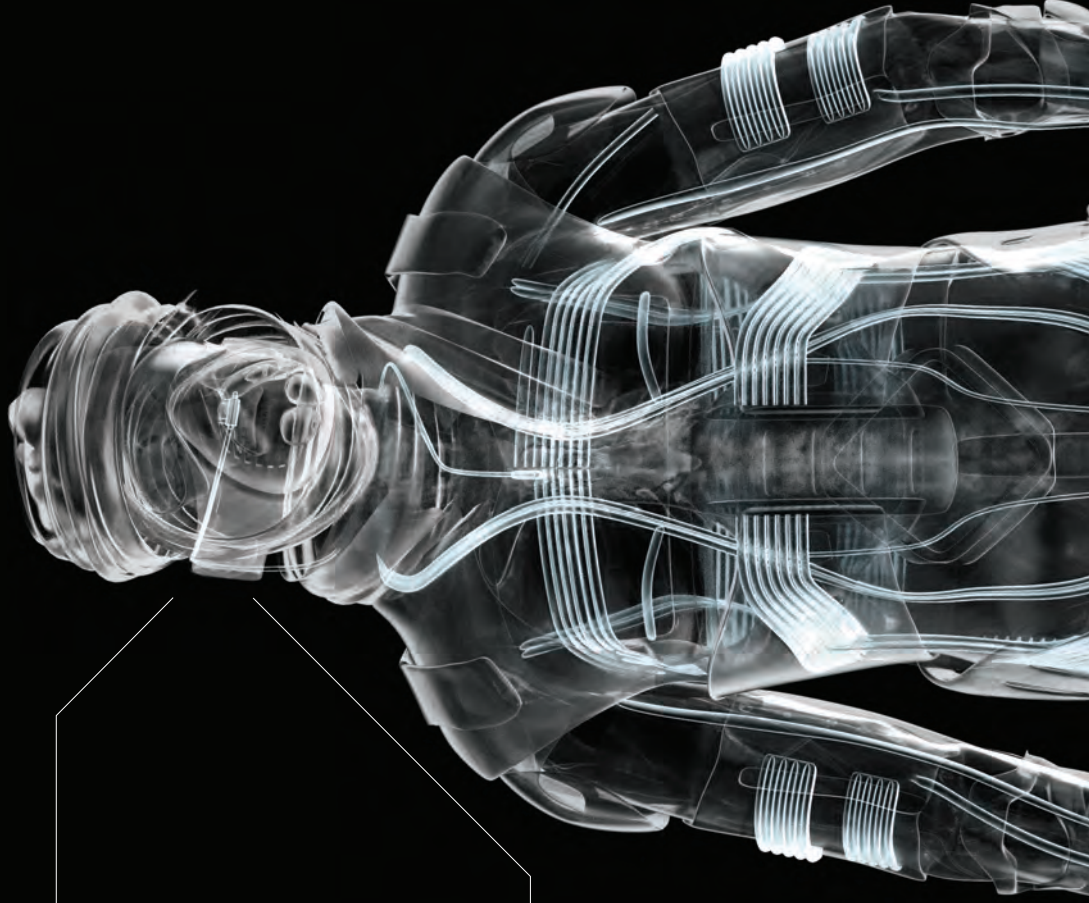
On the Nose

In *Dune*, stillsuit wearers are instructed to breathe in through their mouth and out through their nose, and any moisture from the exhale is captured by tubes attached to their nostrils. West's version wasn't a working breathing apparatus, she says, but "it had to be comfortably fitted into the nose of the actors." Just try not to sneeze.

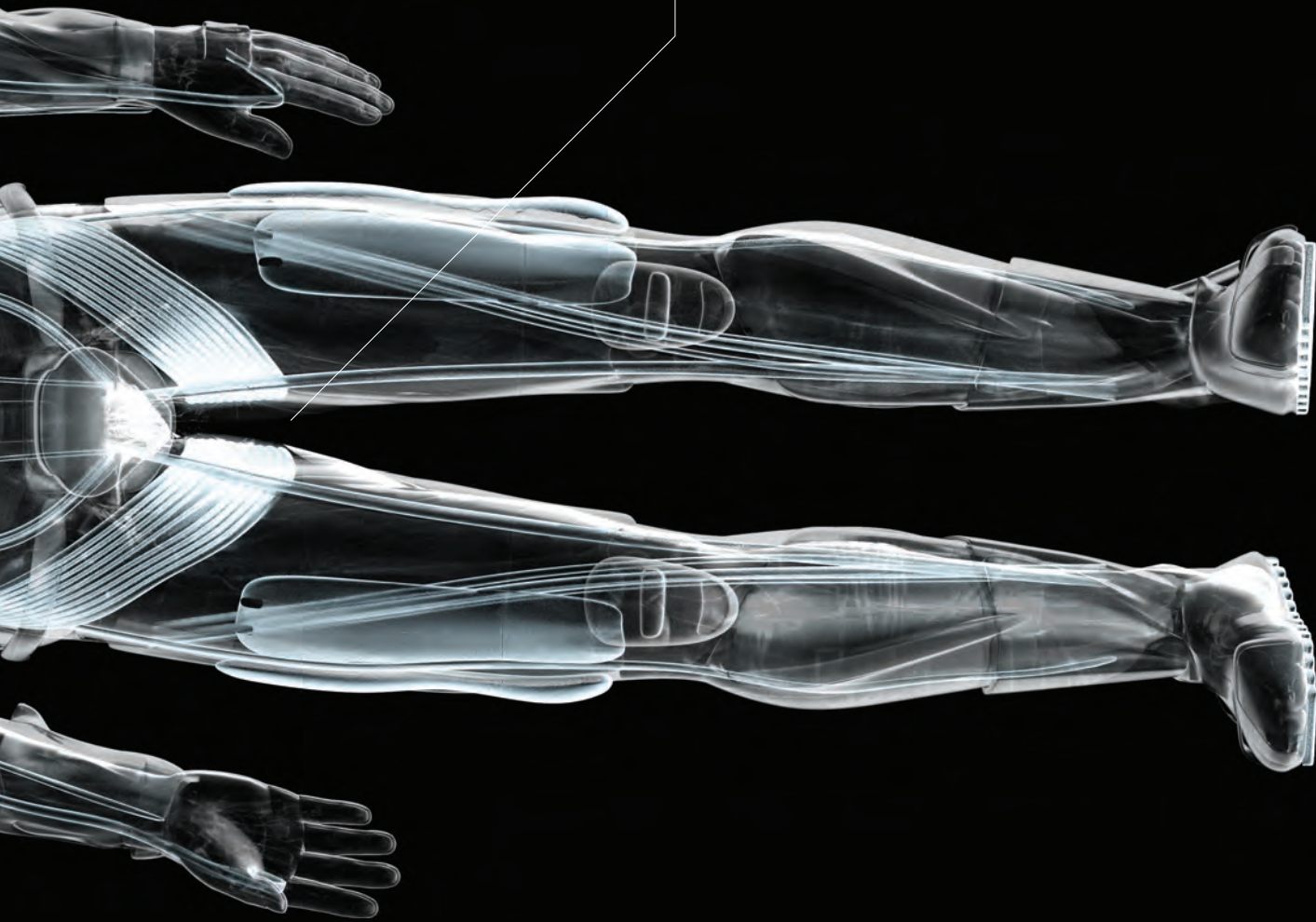
BUT NOT REALLY.
BECAUSE ACTUAL
FUNCTIONING
STILLSUITS ARE
STILL IMPOSSIBLE.

EVERYONE TALKS about the sand-worms and the spice, but the coolest thing Frank Herbert invented for *Dune*—even he seemed to think so—was the stillsuit. Worn by the inhabitants of the desert planet Arrakis, stillsuits capture any moisture that leaves the body and recycle it back into drinkable water. They also look pretty sick, all tubes and piping and chest plates (a cosplayer's wet dream). For Denis Villeneuve's *Dune* adaptation, costume designer Jacqueline West wanted the look of the stillsuits to reflect their ecological necessity. "It was such a prophetic book about a planet that was robbed, as ours has been, of its resources," she says. "We wanted the suit to be made exactly as it would have been with Frank Herbert's descriptions." Could such a thing ever work in the real world? Most likely not—but it's still cool to deconstruct.

—ANGELA WATERCUTTER



Icon illustrations by Calvin Sprauge
Illustration based on concept art courtesy
Warner Bros. Pictures and Legendary Pictures.



Material Science

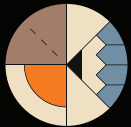
One of West's challenges was to design suits that looked as though they kept moisture in but also didn't suffocate the actors. To do that, the costumers constructed a "fabric of the future" out of heat-melted layers of foam combined with cotton gauze and acrylic mesh. It couldn't *actually* perform a stillsuit's key survival functions, though—trapping perspiration and pulling out the salt (a notion that backfires to begin with, as the point of sweat is that it cools the body through evaporation).



Get Pumped

Stillsuits store water wherever there's space and then use motion to circulate it around the body—even in West's real-life versions. To keep the actors cool while filming in the scorching deserts of the Middle East, her suits had pockets of water near the head and anywhere they would look natural—their thighs, chest, biceps, butt. "We put them wherever they would keep a nice shape," West says. "They had to look good."

Senior editor ANGELA
WATERCUTTER
(@WaterSlicer) leads
culture coverage at WIRED.



Perfect Fit

Stillsuits hug the body like a second skin. So West, in close collaboration with Villeneuve and dozens of costumers, made mannequins of each actor and used them to fabricate a suit to their exact measurements. "They were built amazingly well," says Javier Bardem, who plays the Fremen leader Stilgar.



Porta Potty

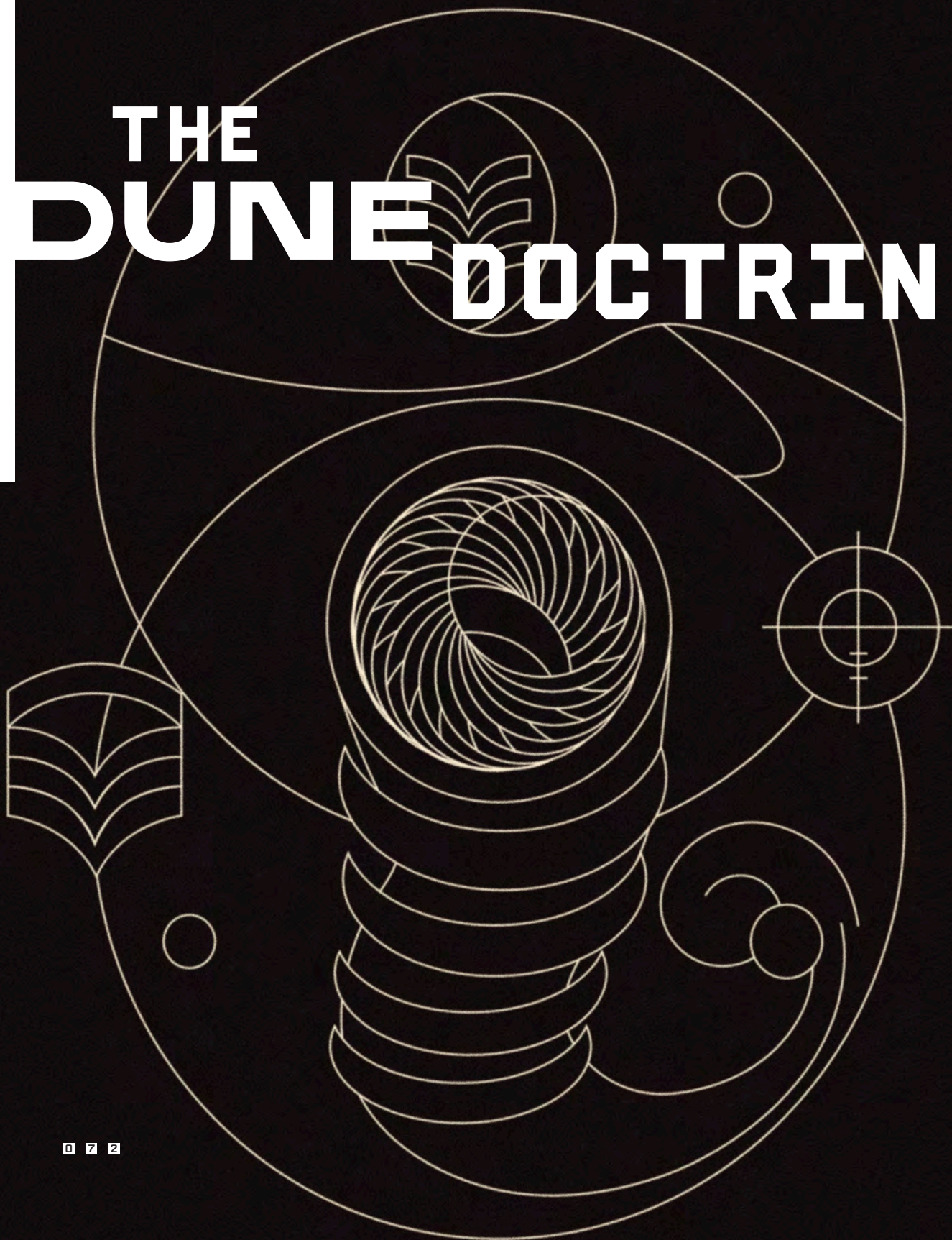
Not only can you whiz and poop in your stillsuit, it's encouraged, as that's your main source of recycled water. Alas, *Dune*'s stars weren't able to use their costumes as diapers (that we know of). Not even the finest NASA tech—the ISS's Urine Processor Assembly—could do what Herbert described.



Body of Work

The human body is the engine of a stillsuit. Walking, running, breathing—Herbert imagined all that energy could be harnessed to power the reactions necessary to recycle water. Sadly, it's pure fiction: Our bodies can't get enough energy from the food and oxygen we ingest to turn waste back into drinkable H₂O.

THE DUNE DOCTRINE



0 7 2

ILLUSTRATION BY MARK PERNICE



HOW FRANK HERBERT'S
NOVEL FORESAW—
AND INFLUENCED—
HALF A CENTURY OF
GLOBAL CONFLICT.

BY ANDY GREENBERG

J

JUST BEFORE HIS DEPLOYMENT to Iraq in 2003, Ryan Kort spotted a paperback copy of *Dune* in a bookstore near Fort Riley, Kansas. The 23-year-old second lieutenant was intrigued by the book's black cover, with an inset image of a desert landscape next to the title and the silhouettes of two robed figures walking across the sand. Despite its 800-plus pages, its small print made it a relatively compact cubic object. So he bought it and carried it with him to the Gulf, the only novel he packed in his rucksack along with his Army manuals and field guides. ¶ Kort read the book during moments of downtime over the next weeks, as he led his platoon of 15 soldiers and four tanks through the Kuwaiti desert, and later when they took up residence in a powerless, abandoned building

in Baghdad. It told the story of a young man who leaves a lush green world and arrives on the far more dangerous and arid planet of Arrakis, which holds beneath its sands a critical resource for all of the universe's competing great powers. ("At the time, when people said 'This is a war for oil,' I would kind of roll my eyes at them," he notes regarding the Iraq War. "I don't roll my eyes about that anymore.")

The parallels felt uncanny, he remembers. As the call to prayer rose up around him one afternoon in that darkened building in Iraq's capital, he says he sensed a connection to *Dune*. Reading the book felt almost like seeing into a larger story that mirrored the one in which he was playing a small part. "Something in the book really clicked," he says. "It transcended the moment I was in."

Kort would become a *Dune* fanatic, reading and rereading Frank Herbert's entire six-book series. But it was only years later, after his second deployment to Iraq—a far tougher tour of duty in which he was stationed in a hotbed of Sunni insurgency, with his troops repeatedly hit by roadside bombs—that he began to see deeper similarities.

After all, in *Dune* it's the native Fremen whose insurgent, guerrilla tactics ultimately prove superior. Not those of the Atreides protagonists, the Harkonnen villains, or even the galactic emperor and his spartan Sardaukar warriors. No matter which analogy you choose for the United States—or whether the Fremen in that analogy are Iraqi or Afghan—the insurgents outmatch or outlast the superpower.

"You look at it now and you think to yourself, well, of course the lessons are there, right? We've learned that a preponderance of technology doesn't guarantee success. That the military element of national power alone can't secure your objectives at times," says Kort, who today serves as a strategic planning and policy officer for the Army. "There are these messy human characteristics in there, where people have honor and interest bound up into it. And the adversary is sometimes willing to pay higher costs."

In the decades since Herbert published *Dune*, in 1965, the book's ecological, psychological, and spiritual themes have tended to get the credit for its breakout success beyond a hardcore sci-fi audience. In his own public commentary on the book, Herbert focused above all on its environmental messages, and he later became a kind of ecological guru, turning his home in Washington state, which he called Xanadu, into a DIY renewable energy experiment.

But reading *Dune* a half century later, when many of Herbert's environmental and psychological ideas have either blended into the mainstream or gone out of style—and in the wake of the disastrous fall of the US-backed government in Afghanistan after a 20-year war—it's hard not to be struck, instead, by the book's focus on human conflict: an intricate, deeply detailed world of factions relentlessly vying for power and advantage by exploiting every tool available to them. And it's Herbert's vision of that future that is now revered by a certain class of sci-fi-reading geek in the military and intelligence community, war nerds who see the book as a remarkably prescient lens for understanding conflict on a global scale.

0 7 4

Written even before the advent of America's war in Vietnam, *Dune* captures a world in which war is inherently asymmetric, where head-on, conventional military conflict has largely been replaced with all the subtler ways that humans seek to dominate one another: insurgency and counterinsurgency, sabotage and assassination, diplomacy, espionage and treachery, proxy wars and resource control. For the military officers and intelligence analysts who still read and reread *Dune* today, it presents an uncanny reflection of the state of geopolitical competition in 2021—from the pitfalls of regime change to the terra incognita of cyberwar.



ON A RECENT Sunday afternoon, I brushed the dust off of an original *Dune* board game I had found in my late father's house, a pristine cardboard relic released in 1979 that sat untouched on a shelf in my office for two years. The game, whose object is to conquer the entire territory of Arrakis, seemed like a helpful way to understand *Dune*'s microcosm of galactic conflict. So I persuaded some unsuspecting friends to try it.

It quickly became clear that, rather than simplify *Dune*'s dynamics, the game aggressively leans into the book's Talmudic complexity. Opting for the "basic" rather than "advanced" version of the rules, it still took two and a half hours for us to get through the first turn. Understanding any card required consulting a reference sheet that read like the fine print on a credit card statement. Rules had caveats, caveats had exceptions. And every player seemed to be able to break the rules in different ways. The Atreides player could look at cards that remained face down for the rest of us. Sandworms destroyed all the armies they touched, except the Fremen's, who could ride them around the board. The Harkonnen player periodically revealed that other players' characters were actually traitors secretly working for him.

Different sides even had their own paths to victory: The Fremen could win by preventing anyone else from winning. The Bene Gesserit player, representing *Dune*'s genetically engineered order of psycho-manipulative illuminati, wrote down

A SPARTAN NATIVE POPULATION DISILLUSIONED WITH INVADERS AFTER A PREVIOUS SUPERPOWER'S INCURSION: THE PARALLELS BETWEEN *DUNE* AND AFGHANISTAN WERE DIFFICULT TO AVOID.

a prediction before the first turn, guessing which player would win and when. If that prediction came true, they would win instead. The conflict wasn't merely asymmetric; each player was in some sense playing a different game.

Dune's vision of human struggle might appear on its face to be the opposite of the world in which Herbert lived in 1965, when two superpowers seemed locked in an existential stalemate. But the Cold War's threat of mutual nuclear annihilation set the stage for the era of unconventional warfare that Herbert saw so clearly. In *Dune*, the Great Houses have signed a convention against the use of atomic weapons. That results in warring powers—namely the Atreides and Harkonnens—resorting to exactly the sort of restricted, covert, deceptive tactics that defined modern conflict during the Cold War and ever since.

"You have two parties that have no recourse but violent conflict. But you also have norms that mean violence must be as narrowly constrained through as tight an aperture as possible," says Alex Orleans, a threat intelligence analyst at security firm CrowdStrike and a former analyst under contract at the Department of Homeland Security, who arrived to our interview with seven single-spaced pages of notes about *Dune's* lessons for national security. "And so the idea becomes to engage in very limited, discrete, clandestine operations."

In *Dune*, Herbert creates a term for that not-quite-war: *kanly*, defined in the book's glossary (yes, it has a glossary) as a "formal feud or vendetta under the rules of the Great Convention, carried on according to the strictest limitations." Just as the Harkonnens plant hunter-seeker assassination bots in the Atreides compound and the Emperor hides his Sardaukar supersoldiers in Harkonnen uniforms, Orleans sees *kanly* today in everything from US drone strikes to Russia's invasion of Ukraine with "little green men" wearing no insignia.

The term *kanly* itself gives one hint of where Herbert pulled some of his ideas of unconventional warfare: It's a word for "blood feud" used for centuries by some Islamic tribes of the Caucasus, which Herbert read about in historian Lesley Blanch's 1960 book *The Sabres of Paradise*, an epic chroni-

cle of those tribes' brutal and mismatched war with Russian imperialist invaders. Herbert explicitly borrowed from that history: His Fremen speak Chakobsa, named for a language from the Caucasus, and entire lines from Blanch's text end up in the mouths of *Dune's* characters.

But in the Caucasus, the Russian invaders eventually won. In the Vietnam War, which Herbert would cover as a reporter for the Hearst newswire only years after writing *Dune* and its first sequel, *Dune Messiah*, the insurgents did. In *Dune*, Herbert placed his bet on the insurgents. "If you'd said in the wake of World War II that the United States would lose a war to guerrillas who didn't have an air force or navy or even really heavy weapons, people would have just thought that you were insane," says Major General Mick Ryan, commander of the Australian Defence College and author of the forthcoming book *War Transformed*. "But *Dune* did kind of presage that, didn't it?"

For Ryan and other *Dune*-reading soldiers, the two wars in Iraq and the war in Afghanistan were even clearer echoes of Herbert's vision. When Ryan describes serving as the commander of the Australian Army's Reconstruction Task Force in Afghanistan's Oruzgan Province in 2006 and 2007, he finds the parallels with *Dune* difficult to avoid. A spartan native population disillusioned with invaders after a previous superpower's incursion, with the Soviet occupation of Afghanistan standing in for years of Harkonnen rule on Arrakis. Young locals whose tribal code of honor dictated that every casualty among them be avenged. The same cultural divisions—and the wholly different games each side was playing—always making victory more elusive than it first appeared.

Today, even in the wake of the Taliban's victory in Afghanistan, *Dune* reads just as much like a parable about the growing tensions between China and other world powers, says Lieutenant Colonel Nate Finney, a former lead China planner for the US Army in Hawaii who's now getting a doctorate in history at Duke University. In that analogy, it's the Chinese who are the Atreides, a rising power threatening to shuffle the galactic order but trying to do so carefully, within the bounds of

THE SPICE OF STRIFE

CARL VON CLAUSEWITZ and Frank Herbert both understood the power of *schwerpunkt*. A 19th-century theorist revered among military geeks the way Paul Brown is revered among football coaches, Clausewitz wrote that each war has a center of gravity—which is how *schwerpunkt* is usually translated—and that victory often flows to the strategist who identifies and seizes it. Depending on the type of conflict, the center of gravity might be an enemy's logistics base or field army, a nation's capital, or even an individual (see: Osama bin Laden in the war with al Qaeda). Whatever form it takes, a *schwerpunkt* is “the hub of all power and movement, on which everything depends,” Clausewitz wrote.

In *Dune*, it's the spice.

In a world where computers and artificial intelligence have been banned, the spice, or “melange,” enables pilots to fold space, traversing galaxies and time. The drug comes only from the planet Arrakis, and when Duke Leto Atrides ventures there to secure it, he's quickly overthrown by Baron Vladimir Harkonnen. The Baron, though, understands spice only as a commodity. In a classic case of colonial short-sightedness, he exploits it to fund his empire, upsetting the Fremen locals in the process. But Paul Atrides, the Duke's exiled son, knows a *schwerpunkt* when he sees it. Following his father's ouster, he befriends the Fremen, becomes their messiah, gains control of spice production, reclaims Arrakis, and becomes emperor of the known universe.

Military heads don't consult Herbert nearly as often as they do Clausewitz, but sci-fi still influences those in the military. In the 2000s, cadets who picked up *Dune* might've found insight into wars in the Middle East; in 2021, the book warns them not to rely too much on technology.

In the age of digital warfare, combatants with the right gadgets can almost fold space. But when everything from GPS to power grids to comms systems is subject to being jammed, spoofed, hacked, or blacked out, relying on tech will get your ass blown up. This has caused the US military to adopt back-to-basics methods, relearning, as Paul did, how to fight analog. Maintaining log books. Using runners and field phones. Fighting off of handwritten orders rather than electronically transmitted ones. It's a painful process for many, but it's necessary. Because today, the *schwerpunkt* in most conflicts—the spice—is digital information itself. —JONATHAN BRATTEN

JONATHAN BRATTEN is a military historian and an officer in the US Army.

its rules. “When I started to see the interstellar politics of *Dune* and why certain houses are doing certain things, it just jumped out at me,” Finney says.

Compared to other works of sci-fi popular among military thinkers—he cites *Ender's Game* and *Starship Troopers*—Finney says Herbert's invented universe uniquely captures the human messiness and sheer complexity of conflict in the real world. “It's really about the interesting, hard part of war. It's not ‘a nuclear bomb goes off and this many millions of people die’ or ‘this plane can fly this far and drop this type of munitions’ or ‘this is the size of the army we need to hold a country.’ What Herbert was looking at was the human aspect,” Finney says. “When it comes to that human experience of war and politics and human interaction, in my mind, it's *Dune*.”

Ryan, the commander of Australia's Defence College, says he has included Herbert's novel on his recommended reading lists for years for the same reason. “I think *Dune* is a very complete story for those who want to study war and human competition as a phenomenon,” he says. He compares its lessons to those of Thucydides' *History of the Peloponnesian War* in their timelessness. “It looks at big strategic ideas and it looks at motivators for people, whether it's ideology, whether it's greed, whether it's the old Greek ‘fear, honor, and interest,’” Ryan says, quoting Thucydides. “*Dune* represents the world as it is: a very complex, sometimes beautiful, sometimes awful thing.”



AMID ALL ITS predictions, *Dune* avoids thinking about how computers, the internet, and AI would reshape the world 25,000 years in the future. Herbert skirts that question by inventing a rebellion against an all-powerful sentient computer thousands of years before the events of *Dune*, leading to a galactic ban on “thinking machines.”

IN THEIR MALWARE, THE HACKERS HAD INCLUDED STRINGS OF TEXT TO IDENTIFY VICTIMS: ARRAKIS02, BASHAROFTHESARDAUKARS. ALL REFERENCES TO *DUNE*.

The book sums up that future history in a single aphorism: “Once men turned their thinking over to machines in the hope that this would set them free. But that only permitted other men with machines to enslave them.”

But the contemporary era of cyberespionage and cyberwar has, in reality, provided yet another domain for *Dune*’s kanly to play out. That domain has, in some senses, proven to be the one where Herbert’s lessons about nonconventional tactics are the most apt of all, where deception, deniability, and asymmetric warfare thrive outside strictures of global conventions.

In 2014, cybersecurity threat intelligence firm iSight Partners discovered a group of Russian-speaking hackers carrying out what appeared to be a widespread espionage campaign focused on Eastern Europe. In their malware, the hackers had included strings of text to identify victims: arrakis02, BasharoftheSardaukars, SalusaSecundus2, epsilonidani0. All references to *Dune*. Drew Robinson, an iSight analyst who worked on reverse-engineering the malware, remembers thinking, “Whoever these hackers were, it seems like they’re Frank Herbert fans.”

The analysts at iSight gave the hackers a fitting name: Sandworm, after the giant subterranean monsters that roam the deserts of Arrakis. Over the next four years, members of Sandworm planted their malware in the US power grid, targeted Ukrainian

electric utilities with the first- and second-ever cyberattacks to trigger blackouts, attempted to sabotage the 2018 Winter Olympics while framing North Korea for the deed, helped carry out hack-and-leak operations against US and French political candidates, and unleashed a strain of self-spreading destructive malware known as NotPetya that inflicted \$10 billion in damage globally, the most destructive act of cyberwar ever seen.

In 2018, after iSight Partners had been acquired by the security giant FireEye and I was a year into tracking Sandworm for a book about the group, FireEye’s director of intelligence analysis, John Hultquist, sat at his kitchen table and laid out the evidence identifying its members: All signs, he said, pointed to Sandworm being Unit 74455 of the GRU, Russia’s military intelligence agency, a theory that would be confirmed by US and UK intelligence only last year.

In the same conversation, Hultquist also explained what he, after four years of analyzing Sandworm attacks, had come to believe were the group’s motives: They were carrying out a kind of guerrilla warfare much like what he’d faced while serving in Iraq and Afghanistan more than a decade prior. Rather than declare open war on the international order, Russia was using digital means to undermine it with brazen but deniable acts of cyber sabotage. “The reason you carry out terrorism is rarely to kill those particular victims,” Hultquist told me. “That’s never why someone tried to hit me with an IED. It’s about scaring the shit out of people so they lose the will to fight or change their mind about the legitimacy of their own security service, or overreact.”

In other words, Russia’s Sandworm hackers were experimenting with a fresh form of asymmetric warfare against a dominant power. After 50 years, *Dune*’s ideas had found new life again—not in the minds of that ruling power’s military analysts but in the minds of those seeking to topple it. ■

ANDY GREENBERG (@a_greenberg) is a senior writer at WIRED and the author of the book *Sandworm: A New Era of Cyberwar and the Hunt for the Kremlin’s Most Dangerous Hackers*.