THE WEEKEND ESSAY

THE RISE OF THE “SCENARIO,” A TRENDY WAY OF FORECASTING OUR DYSTOPIAN FUTURE

In “Biological War,” Annie Jacobsen imagines society collapsing from a man-made plague—part of a wave of such prophecies. But what do we miss when we try to predict the future?

By Gideon Lewis-Kraus

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Illustration by Daniel Zender

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In the fall of 1989, a select group of Soviet scientists was summoned to Obolensk, a secluded municipality on Moscow's periphery, and gathered at what appeared to be an insane asylum to discuss a pioneering technique for mass murder. If someone had been observing the institutional activity from space—a distinctly non-theoretical possibility—they might have seen a shuffle of patients roaming the grounds or playing volleyball in their pajamas. These were actors, hired to play the disturbed as a cover story for something even more disturbing. The eight-story glass building at the center of the complex, which had putatively been devoted to vaccine manufacturing, was in fact a highly classified defense facility. Its remit was called *Biopreparat*, or "biological preparations"—what one participant later described as "the most ambitious Soviet arms program since the development of the hydrogen bomb." The most recent experiments there had at last demonstrated the viability of a weapon that could wipe out entire enemy populations without leaving a scratch on their infrastructure. It was a pathogen genetically engineered to spread within hours, to kill within days, and to resist all existing treatment.

The program was a treaty violation. In 1969, President Richard Nixon had unilaterally dissolved the U.S.'s covert bioweapons initiative, and, over the next six years, the international community had ratified the Biological Weapons Convention, which prohibited the incubation of agents "repugnant to the conscience of mankind." It was a pact to regulate microscopic organisms, but it had a loophole large enough to drive an aircraft carrier through: there was an exemption for developing bioweapons for "defensive" purposes. The carve-out was troubling but also sort of moot, because the treaty had no meaningful enforcement mechanism. Presumably the Soviets weren't the only defectors.

The achievement discussed in Obolensk was a "chimera," or a designer pathogen spliced together from multiple sources. Such a thing had been feasible in principle

for almost two decades. In the initial stages of infection, the pathogen would resemble a known illness—one vulnerable to standard vaccines or drug remedies. The administration of antibiotics would trigger a second pathogen that had been occluded inside the first. An infection that was left untreated was excruciating and fatal. A treated infection was differently excruciating and also fatal. The first wave of an epidemic would kill a lot of people. The second wave would terminally undermine all public trust in an enemy regime. Mass casualties of disease were the prelude to mass casualties of chaos.

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Much of the *Biopreparat* work was carried out in the Siberian forest's State Scientific Center of Virology and Biotechnology Vector. A maximum-containment facility for biological research, or BSL-4 lab, Vector was at the time one of only two official repositories of live smallpox bacteria. (The other was the Centers for Disease Control and Prevention, in Atlanta.) Its freezers also contained samples of Ebola, Marburg, and other viral agents. As the intelligence community has long been aware, the Russian Federation took up where the Soviets left off. On September 6, 2019, there was an explosion at Vector, and one worker was taken to the hospital with third-degree burns. Russian officials attributed the accident to a faulty gas tank, and firefighters extinguished the blaze before it posed an existential threat.

All of this, so far, is true. It is the real-life preamble to Annie Jacobsen's "Biological War: A Scenario." The new book is a sequel of sorts to Jacobsen's "Nuclear War," and it, like its predecessor, is a chimera. It combines strains of investigative reporting, drawn from both historical archives and contemporary sources, and strains of reality-adjacent but speculative fiction. As the author puts it, "The scenario that follows—chronicling the hours, days, and weeks after the release into society of a genetically modified biological weapon—is based on facts and projections sourced from exclusive interviews with presidential advisors, Defense Department officials, medical doctors, microbiologists, epidemiologists, diplomats, congresspeople, C.I.A. officers who work to counter weapons of mass destruction, Federal Emergency Management officials, and first responders who train for mass-casualty biological incidents and attacks." It also, she continues, "echoes biological war scenarios run by the Pentagon."

The narrative begins with another fire at Vector. This time it goes uncontained. The virus spreads to the United States in less than a week, and the Administration imposes martial law. Then the state collapses. The President is trapped alone inside a bunker, maybe forever. The surface landscape is patrolled by perhaps a million armed men in full biohazard gear. Almost everyone else is dead. No spoiler alert is necessary. Jacobsen herself warns, at the end of her introduction, that the book "ends in dystopia."

The hypothetical events that unfold along the way are grounded in details that are, for the most part, highly plausible; she intermittently breaks the main narrative to provide the context of a relevant "History Lesson." The danger is that any account of doomsday that feels credible can also feel domesticated. The horrors of uncertainty are translated into the language of manageable risk—risk that somebody, somewhere, has the responsibility and foresight to manage. In her acknowledgments, Jacobsen pauses to remind her readers that her tale's painstaking realism is just a literary device. She has titled the book "Biological War: A Scenario," not "Biological War: The Only Scenario." Some of the alternatives, she continues, are "far worse."

This particular scenario opens at a "crowded disco" in Frankfurt. An American traveller is passing through on a layover from a hunting trip to Siberia, where he was infected by a strain of the pneumonic plague engineered "to kill human beings in the most atrocious ways." Had he been exposed to a more run-of-the-mill pneumonic plague, symptom onset would have already consigned him to bed. As it happens, however, he feels not crummy but incredible—"euphoric," even. The novel plague has been insidiously designed to begin with the delivery of a powerful "neurochemical high." Carriers experience a manic and irresistible sociality. By the time his flight to Texas reaches cruising altitude, however, he no longer feels euphoric. His lungs have begun to rot—pulmonary necrosis—and he showers the lavatory in bloody, black-tissued vomit. The necrotic tissue emits a "putrid, foul odor," which his fellow-passengers attribute to a nearby baby's soiled diaper.

In theory, there's still time to quarantine the plane upon landing. Washington knows about the Vector mishap. Reconnaissance satellites reported the explosion within minutes of its occurrence. It takes only eleven hours for the President to convene an emergency late-night meeting of his Principals Committee. The relative speediness of the response is the result of COVID. Health officials have told themselves that "mistakes made during the pandemic cannot happen again," and the current situation is potentially much graver; as Jacobsen's C.I.A. director puts it, "*Given Vector's pathogen inventory, we can easily have a worse-than-Wuhan situation on our hands*." Containment is an urgent priority. The Secretary of Defense (now known as the Secretary of War) proposes a nuclear strike as a precautionary response, but the team decides that nuclear annihilation is scarcely preferable to a new pandemic. The Russian government has yet to express commensurate concern, and has neglected to respond to urgent messages from the U.S. Embassy. It has already assured its own citizens that "the incident poses no threat to the surrounding community."

Russia's public messaging holds up until locals begin to die. The Kremlin pivots to a story that blames the fatalities on marmots, which can carry the plague. Marmots, woodland creatures whose raw viscera are believed by Siberians to have medicinal properties, are not infrequently hunted by poachers and sold at wet markets. It's a plot point that recalls an actual incident in 1979, when dozens of townspeople near another Soviet lab were killed by the inadvertent release of aerosolized anthrax and their deaths were ascribed to a "truckload of contaminated meat sold on the black market." Back in Jacobsen's world, a previous pattern of deception isn't the only reason her hypothetical U.S. officials conclude to mistrust the Russian explanation. It is late spring, and the marmots are hibernating.

It has taken the outbreak less than three days to reach the Dominican Republic, where a haphazard and desperate naval exodus is repelled by the American military with lethal force. Unfortunately, the sickness is already here. Near Los Angeles's Skid Row, the indigent and unwell begin to arrive at an urgent-care facility, their vomit a "glob of frothy sputum." Medical personnel are unprepared to diagnose the city's first plague in a hundred years. The apocalyptic scene rapidly comes to resemble something familiar from zombie films or first-person shooters. Cops in riot gear fire in panic at raving, blood-soaked hordes; the victims suspect that they've been subjected to some nefarious form of population control; these and other conspiracy theories are immediately amplified, with vivid and harrowing footage, by cynical online influencers. Local residents take up arms to slaughter homeless people in the street. The reflexive response to a public-health crisis—to dispatch medical and law-enforcement teams to the front lines—only guarantees the swift elimination of precisely those responsible for effective mitigation.

Thus far, "Biological War" amounts to an exponentially gorier version of recent history. What happens next is a shift from street-level cinematic montage to administrative calculation. The national stockpile of antibiotics is rationed among local distribution centers. Instructions for pickup are discreetly communicated to health-care workers, soldiers, politicians, and cops, but word quickly gets out and

the medical depots are swarmed by armed citizens desperate to save themselves. In her research for the book, Jacobsen spoke to the former Senate Majority Leader Tom Daschle, who described "deeply nightmarish" circumstances in such an emergency: "People doing inhuman things just to survive." Quarantine orders are met with wholesale insubordination, and the government begins to ratchet its way to full martial law. The President shuts down the internet.

In FEMA's basement SCIF and at the Pentagon, computational modellers indicate that every American, excepting those in full biohazard gear and those living in extreme isolation, will be infected in less than six days. During the worst of the COVID pandemic, Jacobsen writes, about one case in a hundred was fatal. If the Russian spokesman's statistics are to be trusted, the fatality rate of this "atypical bacterial pneumonia" is assumed to be a catastrophic twenty-five times higher. The President and other top officials are successfully removed to undisclosed locations, and the "Devolution Plan"—a highly classified protocol to insure continuity of government—is set in motion. The Administration has shifted into subsistence mode. There are enough antibiotics for at most a few million people. Officials have no choice but to write off eighty million Americans as the walking dead.

The assumptions made by the computational modellers, it turns out, are reasonable but inaccurate. Antibiotic efficacy is, in fact, worse than zero. Taking antibiotics activates the second pathogen hidden inside the first—the "chimera weapon's booby-trap mechanism." Spliced into the pneumonic plague's genome are genes of equine encephalitis, which causes acute neurological symptoms. The ostensible cure "turns a plague infection that can be survived, with immediate antibiotic treatment, into a death sentence accompanied by the complete destruction of trust in medicine." The presumed fatality rate of twenty-five per cent was off by a factor of four. A tiny remnant will survive, but only in total isolation or in comprehensive biohazard gear.

From time to time, Jacobsen reminds the reader that her "scenario builds on science fact, not science fiction." She has taken real events and tweaked them just enough to make her counterfactual seem not only conceivable but inevitable. Other than a few debatable instances—she claims, for example, that the Russians managed to create an actual "chimera weapon," which has never been proved—she gathers enough evidence from the recent past to project a legitimately frightening future. By the end, however, her methodological commitment comes to seem like a creative constraint. She compares the post-plague American landscape to the Afghanistan of 2012, with "large, fortified military facilities in city centers" and "armed and weary soldiers permanently on village security patrol." This analogy is strangely anticlimactic and almost consoling, but a pedestrian ending comes with the territory in a scrupulously realistic book about the inconceivable. The problem with the truly unprecedented is that there's no good precedent for it.

The "scenario" is a voguish genre at the moment. Jacobsen's previous book was a scenario about nuclear war. Pretty much everyone ends up dead. The most scenario-rich environment is A.I. prognosis. Last year, a group of rationalist forecasters published "AI 2027," another scenario, in which, again, pretty much everyone ends up dead; a few weeks ago, they followed up with a more optimistic vision. In June, a group of anxious European policy researchers issued Europe 2031, a scenario in which civilization between the Urals and the Atlantic ends up at least functionally extinct. Jacobsen's book touches explicitly on A.I. risk in only a few sentences at the end. The kinds of biological weapons she describes were once restricted to covert nation-state programs; now they can "be engineered by someone with minimal training in biology, using tools that are increasingly accessible and widely available, including with AI-enabled systems." It is nevertheless difficult to read a book about any given extinction risk without recalling the current A.I. discourse. That may have been intended. The preface of "Biological War" ends with the observation that a hypervirulent and incurable germ "could be twenty-first-century humans' last invention." In an endnote, she credits the line to the philosopher Nick Bostrom, who invoked the idea in a 2015

TED talk. The title of the talk was "What Happens When Our Computers Get Smarter Than We Are?"

It is widely, if not universally, believed in Silicon Valley that the arrival of advanced A.I.—first in the form of artificial general intelligence, then on the plane of artificial superintelligence—will represent the "hinge of history," or the grand inflection point of the species, a notion that began to circulate on the fringe a few decades ago, and was subsequently popularized by Bostrom. Recently, it has become a widely held premise that life, should it continue to exist, will soon become entirely unrecognizable. This conviction comes in different flavors. The accelerationists look forward to paradise on earth. The doomers argue that the title of a recent book on superintelligence by Eliezer Yudkowsky, an A.I. researcher, is pretty much all there is to say: "If Anyone Builds It, Everyone Dies."

Outside of Silicon Valley, there is a tendency to dismiss such prophecies as, at best, patently unserious. Some skeptics take scenarios like "AI 2027" as too self-evidently silly to merit anything but an eye roll. Others respond with something that better approximates a real argument. The key characteristic of history, in this more refined account, is that it has a long and sterling track record of continuity. Certain things may change incrementally—electricity, antibiotics, democracy—but it is the habit of the future to more or less resemble the past. Given the propensity of today to look a lot like yesterday, the odds that tomorrow will look like today are overwhelming. As we have learned from intermittent financial crises, "this time it will be different" is almost always a dumb bet. The world has never revealed a talent for radical overnight transformation. Society muddles its way through.

Most of the time, it seems wise to assume such a deflationary attitude. There is a difference, however, between the default belief that certain predictions are wrong and the default belief that certain predictions are *embarrassing*. As recently as the nineteen-nineties, when *Wired* magazine seemed like a monthly dispatch from beyond the event horizon, the fashionable pose to assume was one of electric

optimism. Now it is distinctly unfashionable to get overly worked up one way or another about technological novelty. The adoption of an inductive argument about the future—one in which the sun always rises because the sun has always risen—has come to function as a marker of temperament. *We* are the sort of people who can see through the hysteria and the hype; *you* are the sort of people who consider yourselves specially elected to witness the singularity. *You* entertain the naïve conviction that everything can be deduced from first principles; *we* share the more elegant understanding that everything should be placed in historical perspective. *We* look cool; *you* look silly.

The flaw in "our" side of the argument—among people who are inclined to view a taste for inductive dismissal as a signal of sophistication—is that we have already decided what counts as historical evidence, or what is called a "reference class." If you have limited your reference class to "prophecies that correctly anticipated wholesale human salvation or extinction," you can take succor in the fact that in retrospect every such prophecy has looked idiotic. It is easy, however, for members of the opposing tribe to counter that our choice of reference class has rigged the game. (The economist Robin Hanson, in one of his more memorable coinages, calls this "reference-class tennis.") We have declared out of bounds such events as the rapturing of the dinosaurs. There are much less extreme examples, too. In the excellent book "Apocalypse," published last year, the science journalist Lizzie Wade draws upon recent archeological research to describe our species' repeated encounters with the end of the world: Doggerland, a vibrant swath of paleolithic Europe, disappeared beneath the North Sea; a freakish rise in global temperatures forty-two hundred years ago resulted in the terminal exhaustion of the Indus Valley civilization; the arrival of the conquistadors was an eschatological experience for the Aztecs. Part of the point of Wade's book is that individual people proved individually resilient, and life carried on. But it can also be read to argue that something well short of an extinction-level event can introduce real historical discontinuity.

On the one hand, Wade's examples establish a reference class for unimaginable rupture: terrible things have happened on a comprehensive scale before, which suggests that they might very well happen again. On the other hand, however, it's easy to draw the wrong lesson. The existence of these precedents—many of which, not incidentally, involve imperial ambition or climate change—is taken as a credential of their seriousness. If something has happened before, we carry a warrant to worry that it might recur. We can in turn rule out, as unserious, excessively worrisome anticipation of truly novel disasters. There's danger here. If we write off the kinds of vulnerabilities we've never encountered just because we've never encountered them, we may only be wrong one time, but we will have guaranteed ourselves to be wrong the one time it matters most. The premise that the future will resemble the past because it has always resembled the past will continue to be true until the first time it isn't.

We have no choice but to resort to scenarios. There is one obvious way in which the scenario of "Biological War" is an important intervention. If one examines the vast scope of human history, one finds plenty of examples of devastating plagues. One might nevertheless reasonably conclude that in the face of tremendous adversity and suffering we mostly managed to muddle through O.K. Jacobsen's book is a persuasive and unnerving argument to the contrary. She has done a lot of serious reporting to construct a fictional time line in which for the first, only, and final time we do not muddle through O.K. Hers is not just a lesson about bioweapons. It should destabilize those of us who are quick to sneer at *any* talk of extinction risk as mere Book of Revelations cosplay.

At the same time, however, "Biological War" serves a lesson for those who are in the business of radical prediction: they might not be thinking radically enough. The book is at once terrifying and inert. Jacobsen has assembled plenty of relevant precedents for an unprecedented cataclysm. She set out to make a point, and she succeeded. Perhaps it will help establish a greater consensus to get rid of bioweapons. Obviously, this is important work, and in her particular scenario there is something to be said for a narrow focus. One of the reasons that skeptics are

quick to dismiss apocalyptic A.I. forecasts is that they, too, can feel as though they have been argued backward from foreordained conclusions. They might be more broadly compelling if they felt more inventively open-ended. The civilizations in Wade's book did not collapse in accord with the darker passages of their own Scriptures, as the people imagined they might. Their fates were far more shocking.

At its best, "Biological War" is a story about what happens when people lack the nerve or the constitution to take scenario-planning itself with the gravity and curiosity it deserves. For several decades, the U.S. government has routinely engaged in tabletop exercises contrived to ready our response to the sort of unspeakable ordeal Jacobsen contemplates. In the late nineteen-nineties, Jacobsen explains, the national-security establishment conducted a multiagency simulation called TOPOFF 2000. Part of the scenario involved the weaponization of pneumonic plague by a terrorist cell in Denver. The game was played out through only four generations of infection before it was terminated. The cutoff wasn't because it resulted in a plan of action. The implications were simply so dreadful that the officials just gave up. In 2001, the Andrews Air Force base hosted a follow-up called Dark Winter. As Jacobsen describes it, Al Qaeda buys smallpox from Russia and releases it in three American cities. Cabinet members reserve almost a fifth of the government's vaccine stockpile for themselves, and the public reacts with mass looting and violent civil unrest. Her gloss: "Martial law is about to be declared when the Dark Winter narrative abruptly ends."

Our tools, Jacobsen writes, "are advancing faster than the rules that govern them. This gap is where existential danger lives. The point is not panic; the point is pressure." We must act "before we set something irreversible in motion." "Biological War" is an indictment of the weapons programs that created our discomfiting reality, and of a leadership that has allowed it to continue. It is even more severe as an indictment of our collective failure of the imagination. It's not the worst thing in the world to look silly. ♦

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