# EXHIBIT
# 26

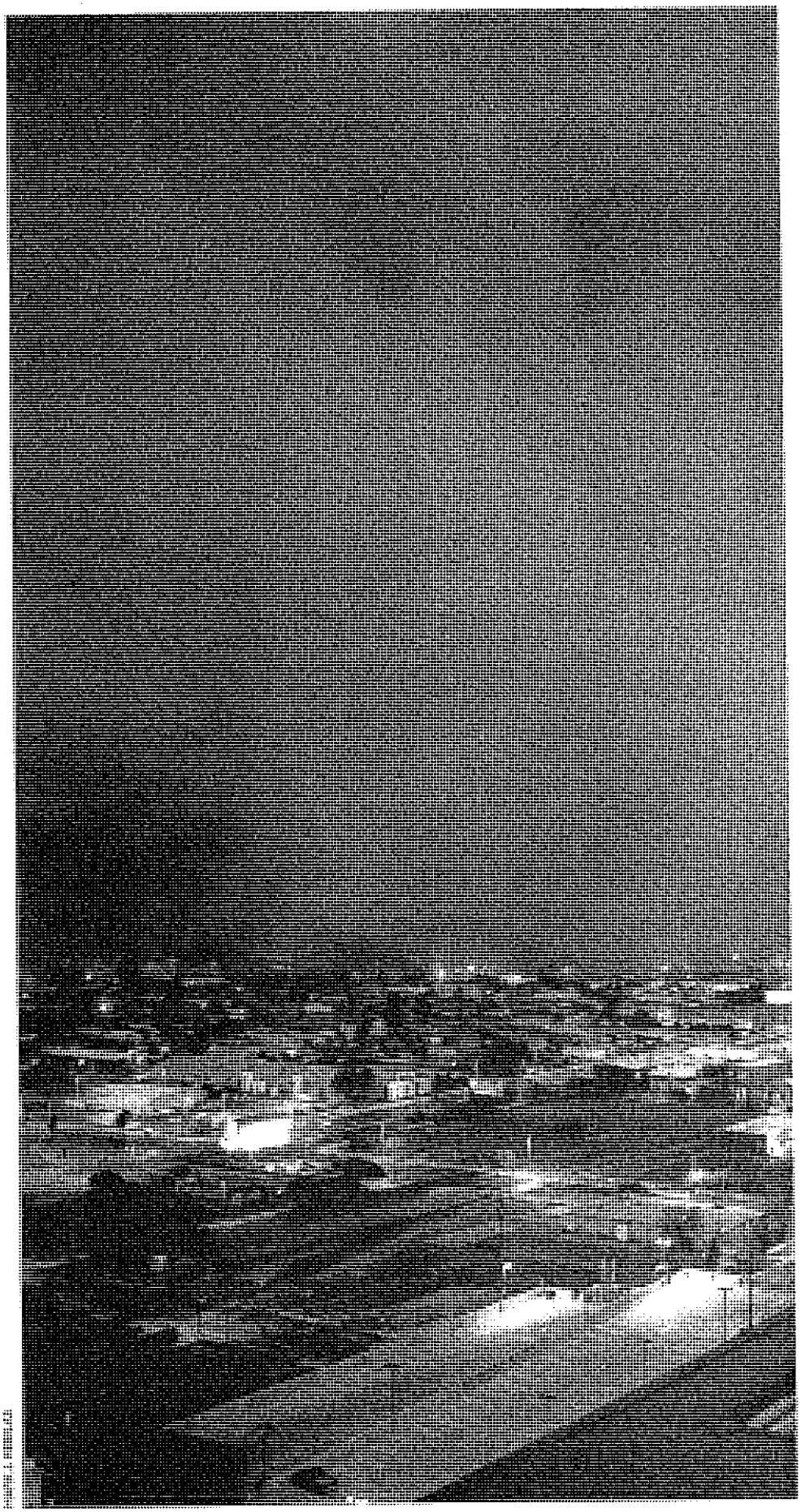
In 1977, the San Joaquin Valley—the swath of agricultural land that runs through central California—was designated a disaster area. Record-low runoff and scant rainfall had created drought conditions. At the beginning of Christmas week, the weather was normal in Bakersfield, the city at the Valley's southern end, but in the early hours of December 20th a strong wind began to blow from the Great Basin through the Tehachapi Mountains. Hitting the ground on the downslope, it lofted a cloud of loose topsoil and mustard-colored dust into the sky.

The plume rose to five thousand feet; dust blotted out the sun four counties away. Traffic on Highway 5, the state's main artery, stopped. At a certain point, the anemometers failed; the U.S. Geological Survey estimated wind speeds as high as a hundred and ninety-two miles an hour. Windows on houses were sandblasted to paper thinness.

The Tempest from Tehachapi, as one researcher called it, spread dirt over an area the size of Maine. Twenty hours afterward, the dust reached Sacramento, four hundred miles north of Bakersfield, in the form of a murky haze that hung in the air for another day, stinging the eyes and noses of the residents. On the twenty-first, it started raining in Sacramento, which turned the dust to mud, coating the cars and sidewalks, and marked the end of the drought.

Over the next several weeks, Sacramento County recorded more than a hundred cases of coccidioidomycosis, otherwise known as valley fever, or cocci, a disease caused by inhaling the microscopic spores of *Coccidioides immitis*, a soil-dwelling fungus found in Bakersfield. (In the previous twenty years, there had never been more than half a dozen cases a year.) Six of the victims died.

In soil, *C. immitis* exists in chains of barrel-shaped units called arthroconidia; airborne, these fragment easily into lightweight spores. *C. immitis* is adapted to lodge deep: its spores are small enough to reach the end of the bronchioles at the bottom of the lungs. We can breathe them in, but we can't breathe them out. Once in the lung, the spore circles up into a spherule, defined by a chitinous cell wall and filled with a hundred or so baby endospores. When the spherule is sufficiently full, it ruptures, releasing the

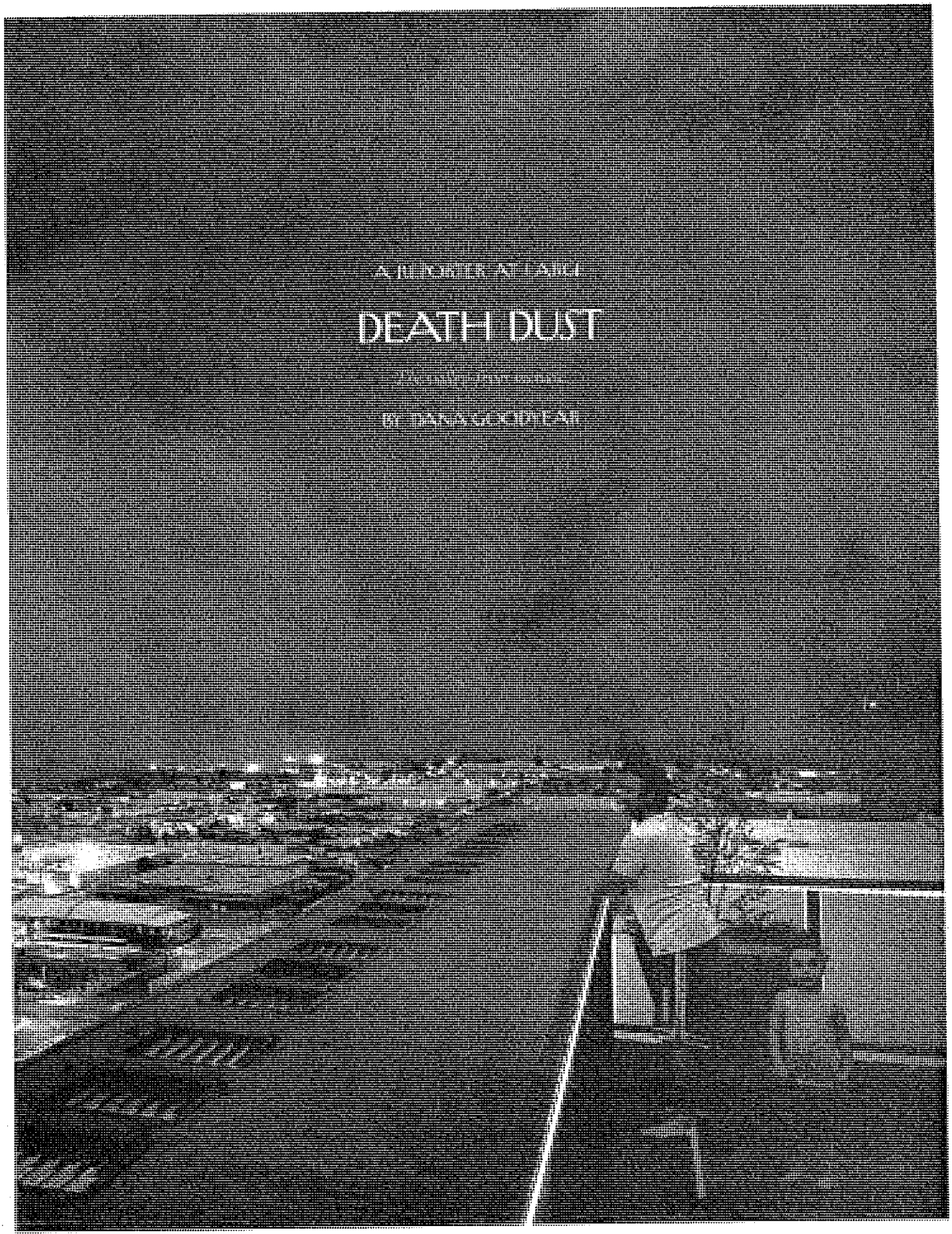


*Dust storms in the West stir up microscopic spores of the toxic soil-dwelling fungus Coccidioides*

A REPORTER AT LARGE

# DEATH DUST

BY TAMA GOCKEBEAR



*immitis. The Centers for Disease Control reports a tenfold increase in infections, some of them fatal.*


*"I'm kind of the Edward Snowden of who around here is sleeping together."*

• •

endospores and stimulating an acute inflammatory response that disrupts blood flow to the tissue and can lead to necrosis. The endospores, each of which will become a new spherule, travel through the blood and lymph systems, allowing the cocci to spread, as one specialist told me, "anywhere it wants." In people with weakened immune systems, cocci can take over.

Every year, there are some hundred and fifty thousand cases. Only forty per cent of people infected are symptomatic, and the signs—fever, cough, exhaustion—can be hard to distinguish from the flu. A small subset of patients will suffer long-term health problems; in fewer still, cocci will disseminate from the lungs into other tissue—skin, bones, and, often fatally, the meninges of the brain. For those with cocci meningitis, the treatment can be brutal. Three times a week, in the hospital, patients are administered an anti-fungal called amphotericin B—"amphoterrible" is how doctors refer to it—with a needle to the base of the skull. To prevent headaches, patients sometimes rest for several hours with their feet elevated above their heads. One patient, a twenty-six-year-old white woman who caught valley fever four years ago, told me that the medicine made her vomit non-stop on a negative incline. She was temporarily paralyzed, underwent three brain surgeries, and has had twenty-two spinal taps. Not long after her diagnosis, the doctors told her mother to make funeral arrangements. Now they tell her she will be on anti-fungals, funnelled through a shunt in her brain, for the rest of her life.

Cocci is endemic to the desert Southwest—California, Arizona, New Mexico, Nevada, Texas—and to the semi-arid parts of Central and South America. Digging—building, drilling, tilling, clearing—stirs it up, and dry, hot, windy conditions, a regional feature intensified by climate change, disperse it. In recent years, infections have risen dramatically. According to the Centers for Disease Control, from 1998 to 2011 there was a tenfold increase in reported cases; officials there call it a "silent epidemic," far more destructive than had been previously recognized. Its circumscribed range has made it easy for policymakers to ignore. Though it sickens many times more people than West Nile virus, which affects much of the country, including the Northeast, it has received only a small fraction of the funding for research. "The impact of valley fever on its endemic populations is equal to the impact of polio or chicken pox before the vaccines," John Galgiani, an infectious-disease physician who directs the Valley Fever Center for Excellence, at the University of Arizona in Tucson, says. "But chicken pox and polio were worldwide."

In 2012, valley fever was the second-most-reported disease in Arizona; two-thirds of the country's cases occur in the state. There is no vaccine to protect against it and, in the most severe cases, no cure. The population of Phoenix has grown by ten per cent in the past decade, and newcomers have no acquired immunity. The elderly and the immune-compromised—including pregnant women—are most susceptible; for unknown reasons, otherwise healthy African-Americans and Filipinos are disproportionately vulnerable to severe and life-threatening forms of the disease. (In one early study, Filipino men were estimated to be a hundred and seventy-five times as likely as white men to get sick from cocci, and a hundred and ninety-two times as likely to die from it.) But, as one specialist told me, "if you breathe and you're warm-blooded, you can get this."

In California, cocci season peaks in the fall. One day in late September, I went to Bakersfield to see Antje Lauer, an environmental microbiologist who teaches at the state university there. She is forty-six and German, with white-blond hair and pink cheeks covered in pale freckles. The arthroconidia, she told me, are notoriously hard to find in the ground. A spot that tests positive once may subsequently come up negative; a positive site can be separated from a negative one by a matter of yards. Little is known about where the fungus thrives and why. Several years ago, Lauer began trying to discern some pattern to its presence. Initially, she said, "I just drove around Bakersfield and used my intuition. I sampled here, I sampled there." On Coles Levee Road, a desolate strip owned by Los Angeles County, which uses part of it as a sewage dump,

she found the fungus nearly every time she looked.

We got in her car and headed west, past almond orchards and derrick fields. Bakersfield High's football team is called the Drillers; sometimes, small oil drills operate in the middle of neighborhoods. Cocci infection has long been considered an occupational hazard for oil workers. "The oil fields sometimes have fences around them," Lauer said. "Occasionally, I've jumped over to get a sample."

Lauer drives with the circulation on and avoids going out on windy days. The mother of a twelve-year-old boy and an eight-year-old girl, she limits her children's outdoor time. "When we moved here, we did soccer," she told me. "We're not doing that anymore." In spite of her efforts, the inside of the car was covered in a golden-brown film. On the dashboard in front of me, a pair of her daughter's footprints smudged the dust.

Lauer's data are not welcome news for communities. "Imagine you owned that house there"—she pointed out the window to an upscale tract home—"and I take a sample and find the valley-fever fungus. Then you want to sell your house. Would you tell the new owner? You would probably not mention it. And if this was published somewhere you would not like it. When I make a map, I will include only those spots where I got permission to sample. But maybe I'll have a second map, an unofficial map, for myself."

Certainly, establishing a link between development and disease would prove politically awkward. Kevin McCarthy, a Republican congressman who represents parts of the San Joaquin Valley and serves as the Majority Whip in the House, is an energetic advocate for valley-fever research: his uncle, a Union 76 gas deliveryman, had a serious case; his mother-in-law's lungs are scarred from an old infection. But he refuses any suggestion that its increased prevalence can be traced to construction. "If you don't build that housing development, we got it because the wind blew," he told me. "You're susceptible to it, regardless, because of the area where we're in. Not having the development is not going to make you less susceptible to it."

The sky was banded: bright blue to blasted white, tallow to orange-gray. "This is a typical day for the fall in Bakersfield," Lauer said. "You can't see the mountains." A tractor idled in a golden cloud. She went on, "But when it gets dark, when the sun goes down, there's a yellowish tint to the sky. It looks really sick." As the landscape grew bleaker—tumbleweeds piled against wire fences—Lauer turned onto Coles Levee Road and stopped the car. There the earth was lunar, crusted and shiny. Salt bushes fanned in a light breeze. The stretch is one of the area's last habitats for endangered burrowing owls and kangaroo rats; Lauer worries that exposing it as a cocci hot spot might jeopardize the animals. "Do you want to get out?" she asked. I didn't.

The chances of anyone's getting infected on Coles Levee Road are low; no one is ever around, certainly not on windy days. But just beyond Lauer's test sites, in a stand of trees, is a popular lake and recreation area. When the wind blows, the spores float there, where no one even knows to be scared.

The first recorded case of cocci involved a soldier in Argentina, who fell ill in 1891. Ulcerated, cauliflowerlike nodes deformed his face, and the doctors who treated him initially thought they'd discovered an infectious form of cancer. (His head, preserved in a jar, is held by the School of Medicine at the University of Buenos Aires, and is brought out for meetings of infectious-disease specialists.) Two years later, doctors in the San Joaquin Valley saw their first case: a field worker from the Azores, blinded by fungating lesions and riddled with abscesses.

The Dust Bowl drove a new population into the way of the disease. One of the first epidemiological studies, conducted in the late thirties by a Stanford-based physician named Charles E. Smith, and using coccidioidin, a skin-test reagent that showed previous exposure, indicated that the illness was most prevalent among people from outside the endemic area—field hands who had moved from Oklahoma and Arkansas, seasonal pickers from Mexico, African-Americans employed in the cotton fields, and Filipinos hired to work in the orchards and vineyards. The worse cases tended to occur in people with darker skin.

In 1940, the Army established the Western Flying Training Command, a program with bases in Arizona and the San Joaquin Valley. The region's climate was reputedly healthful—it had attracted tuberculosis patients for more than a century—but a fledgling awareness of valley fever made the military cautious. The Secretary of War asked Smith to monitor the soldiers for signs of the disease. Smith found the conditions alarmingly conducive to the spread of cocci. Reporting in 1958 on his wartime work in the San Joaquin Valley, Smith wrote, "There were vast earth scars where Minter and Gardner Fields were being built. As there was no dust control in operation, the locally generated dust billowed in clouds over the areas."

At Minter, where eleven thousand Second World War pilots were trained, Smith began systematically testing the enlisted men. "The dispensary where coccidioidin testing was performed was a large tent equipped with an electric hotplate and an empty vegetable can for a sterilizer," he wrote. "Dust was ankle deep and swirled in clouds over the fields." Smith and his colleagues began to see clinical cases of coccidioidomycosis among those who had initially tested negative. Others had converted to positive without showing any signs of illness. Those who initially tested positive never got sick: the first real evidence of acquired immunity.

After a soldier with a new infection died of cocci meningitis—in spite of a flulike illness, he had been allowed to continue his regular, physically demanding work—a protocol of bed rest was put in place. Common-sense dust-control measures that had been instituted were given scientific validity by the data. Paving the airstrips and planting grass, and encouraging recruits to exercise in the swimming pool rather than in the yard, dramatically reduced the incidence of valley fever. Still, cocci is said to have been the leading cause of death for pilots in the Western Flying Training Command.

In the fall of 1944, the government built a work camp for German prisoners of war near Minter Field. Germany had already complained under the Geneva Convention about cocci exposure for P.O.W.s in Arizona, and Smith warned that, come summer, there would likely be an outbreak. No measures were taken to mitigate dust in the work camps, though, and by August there were more cocci

cases among the prisoners than in the entire U.S. Army.

Prisoners continue to be the most susceptible population. In California, there are many large-scale correctional facilities in and around the San Joaquin Valley, and inmates and prison workers are infected up to a thousand times as often as the general population. Donald Specter, the director of the Prison Law Office, who represents California's prisoners in a class-action suit against the state, says that they are sitting ducks. "They work outside," he told me. "They recreate outside. They're on the exercise yards. They walk around outside."

Prison chat forums are full of outraged stories. "The Valley Fever has NO CURE! My husband went in for 4 unpaid traffic tickets we couldn't afford to pay and now he's coming home with this lifetime lung problem that requires expensive medical treatment," one woman posted on the forum Prison Talk. Another said that her husband had been hospitalized three times because of valley fever. "The last time he was there for 11 weeks and almost died," she wrote. "Now he has a hole in his chest about the size of a deck of cards and it still hasn't healed. That was almost 2 years ago." For African-American and Filipino prisoners, and those with suppressed immune systems due to H.I.V. or diabetes, incarceration in the endemic area can be a death sentence. Between 2006 and 2011, thirty-six prisoners died from cocci, twenty-five of them black.

Two prisons, Pleasant Valley State Prison and Avenal State Prison, stand out for their appalling track records. In 2011, in California over all, there were twelve cases of valley fever for every hundred thousand people; at Avenal, the rate was thirty-eight hundred, and at Pleasant Valley it was more than sixty-eight hundred—more than six per cent. In June, after the Prison Law Office argued, successfully, that the conditions amounted to cruel and unusual punishment, a federal judge ordered the transfer of twenty-six hundred at-risk prisoners from Pleasant Valley and Avenal. The skin test, which would have been able to determine which prisoners had already been exposed, and could therefore safely stay, was unavailable. The manufacturer can't afford the six-hundred-thousand-dollar yearly fee charged by the F.D.A. to bring the product to market. Meanwhile, the state pays twenty-three million dollars a year in hospital costs for inmates with cocci. Already under federal orders to reduce its prison population, because of overcrowding, California can't close Pleasant Valley, Avenal, or the other prisons in the endemic area. It is filling the vacated beds with new bodies—prisoners who don't meet the exclusion criteria but who may or may not get sick.

Unwilling occupants of cocci country are one thing. Booming desert cities are another. George Rutherford, who directs the division of infectious-disease epidemiology at U.C. San Francisco, says, "For every prison in the San Joaquin Valley, there's a retirement home in Tucson where people from Ontario are watching golf courses being scraped out of the sand."

This past spring, at a conference on valley fever, Antje Lauer, the soil microbiologist, met up with Ramon Guevara, an epidemiologist who works at the L.A. County Department of Health. Guevara has made it a personal mission to educate people about the emergent issue of cocci in his territory. "In L.A. County, we have so many cases, and we have a potentially large problem, because the population is growing," he told me. The highest rate of infection is in Antelope Valley, a rapidly developing outpost of the county that adjoins the southern edge of the San Joaquin Valley. In the past decade, the number of cases there has increased five hundred and forty-five per cent.

Antelope Valley has seen its population double in thirty years, and it has been transformed from a sleepy agricultural backwater to a dense exurb. Fields that once grew alfalfa—a water-intensive crop that has become too expensive to cultivate—now grow houses, in master-planned communities of twenty-five hundred units. New families have moved in, attracted by affordable prices, and many of them are especially vulnerable to the threat of valley fever. The number of African-Americans in the Antelope Valley town of Lancaster has grown to twenty per cent.

Residents and doctors, Guevara says, are dangerously oblivious. A year ago, he was asked to speak to the grieving grandmother of a fifteen-year-old African-American girl who, after being misdiagnosed at two local hospitals, was given proper treatment at Children's Hospital in Los Angeles. By then, it was too late: the disease had progressed irretrievably, and within two weeks the girl died. The grandmother told Guevara that the family never would have moved to the area had they known the risks. "People have no idea it's here," he said. While others have been reluctant to tie development to the incidence of valley fever, Guevara is not. Analyzing U.S. Census data, he found a near-perfect correlation between new privately owned houses and new infections. "We saw an explosion of cases when the housing development exploded," he said.

Lauer and Guevara are both unconventional thinkers, willing to find ways around problems. At the conference, Guevara was struck by Lauer's research on several bacterial antagonists to cocci that she has identified. "She made a solution from those antagonists, sprayed it, and found that cocci doesn't grow," he said. "It's a bit controversial"—soil ecology is fragile—"but it's the kind of thing we have to do to get to the next step."

Lancaster has a large prison complex, and Guevara suspected that there must be cases there, but, perhaps owing to ignorance on the part of the medical staff, very few were being reported. "They said there was only one case there," he said. "No freaking way." He dug up an ordinance stating that land within twenty-five feet of a road is public, and encouraged Lauer to use it as a guideline when sampling. He wanted her to test around the prison and in the new residential neighborhoods nearby.

In addition to vacant land, Antelope Valley has abundant sunshine and regular high winds, which make it a logical place to build alternative-energy infrastructure. With California pledging to get a third of its electricity from renewable sources by 2020, the region is pitching itself as a hub for the industry. There are some thirty solar projects in development. The mayor of Lancaster is doing the state one better: by 2020, he says, the city will produce more electricity than it consumes. The construction of the solar facilities could have unintended consequences for the environment, though, releasing hazardous dust into the air. "In the afternoon, when the kids come out of school, it's always


IF YOU SEE SOMETHING,
SAY SOMETHING.
PLEASE
HELP

windy," Lauer says. "When they walk home, they all get exposed."

In 2011, the Department of Energy guaranteed a $646-million loan to First Solar, an Arizona-based company, to build Antelope Valley Solar Ranch 1, or A.V.S.R. 1. The project, which has since been sold to a Chicago energy provider, will produce enough electricity to power seventy-five thousand homes—a carbon savings, the company says, equivalent to taking thirty thousand cars off the road. Its site, on the outskirts of Lancaster, occupies twenty-three hundred acres of disused agricultural land, scraped clean of tumbleweeds and grasses to make way for 3.7 million solar panels. In more ways than one, solar workers are the drillers of the twenty-first century: twenty-eight came down with valley fever last spring, during the construction of a pair of large solar projects—one of them run by First Solar—in the central California county of San Luis Obispo.

Julie Schuder, who is forty-one and works with developmentally disabled adults, lives eight miles downwind of A.V.S.R. 1. She moved there from Sacramento with her family a couple of years ago, so that her younger child, an aspiring actress, would be close enough to L.A. to audition. "It's windy here," she told me. "We knew that when we moved in." But after construction started the wind changed. "Suddenly, high winds brought sand with them," she said. "We can stand outside and see the dust clouds coming our way from A.V.S.R. 1." The house was new, custom-built only five years ago. Dust came in under the doors and around the window seams to pile in corners, six inches deep; it got into the attic ducts. Her family started wearing masks inside the house. Sometimes they can't see each other across the living room. No one in the family has come down with valley fever, but Schuder is scared for her kids. "The prisoners are being moved, but we can't leave," she said.

First Solar, which uses hydromulch and soil binders to keep its dirt on the ground, denies any role in the Schuders' plight. "The dust problems in the Antelope Valley go back for decades," a representative of the company told me. "They are valley-wide and long precede any solar development in the area. It's an unfortunate fact of life."

## GRAVITY

1
Upon the black hole Cygnus X-1 that wobbles
as if boffed by an invisible companion,
upon a silk stocking the color of bees
rolling itself up down a leg, upon the soft dip
over the clavicles, which accept only tongued kisses,
upon the tongue that slowly drifts
into the other's mouth and chats
there with her opposite number,
gravity exerts the precise force needed.

2
In the wings of the Eskimo curlew
flapping through the thin air of the Andes,
in the sacral vertebrae of the widow
who stoops at the window to peer
behind the drawn blind, in the saggy skin
under the eyes of the woman
who is in love with a man incapable
of love, who lives on in the heaviness
of emotional isolation, in the lavish
cascade of urine the rhino releases,
in the mouthwater of the child who waits
in shriek position for the dentist,
in the scradged skin dangling in shreds
from the children who lurched toward
the Nakashima River screaming, as if this were
the single aria they had ever rehearsed, gravity
shudders at its mathematical immensity.

3
As long as two kvetches remain alive,
because inside each is self-hatred so hardened
not even nonexistence can abide them,
as long as the hummingbird strikes
the air seventy-four times per second,
as long as the mound of earth remains heaped
beside the rectangular hole waiting to be filled,
gravity cannot be said to impose its will.

4
If the pilot ejects one second too late,
if the condemned man shrinks at seeing
the trapdoor give way, if the man who stands
with fire at his back and a baby in his arms
hears the near neighbors cry,
"Drop her! Don't worry! We'll catch her,"
if the juggler gets behind in her count

In May, a sixty-mile-an-hour dust storm hit Lancaster. The dust made dark fog of the air, and long stretches of the highway were shut down, owing to zero visibility. Masked sheriff's deputies directed traffic. Six people were injured in traffic accidents; one pileup involved twenty cars. At the Schuders' house, the storm deposited huge amounts of silty, light-tan sand. "My husband had to dig

and the bright object flies past the spot
where the other hand was to snatch it,
gravity cannot pause to rectify matters.

5
When a deer kenning us stands immobile,
and for one moment we know we exist
entirely within her thoughts, when cichlid fry,
sensing danger, empty their air bladders
and drop to the river bottom like pebbles,
when the snow goes and millions of leaves
reveal themselves pressed down over the contours
of earth to create her hibernation mask,
when a person in a military cemetery
among grave markers that spread to all the horizons
understands that all of existence has been destroyed
again and again, when depression after mania
causes clock hands to stick and days to crawl,
when the full moon's light creeps across a sleeper
calling to her atavistic soul, when a soldier,
who has always known life is imperfect,
is wheeled to another hopeless attempt
at surgery—but, this time, resolves
to sleep and not wake again until such time
as time begins again—then gravity
grips us to the earth, and crosses its fingers.

6
In the case of the last ancient trees at Ypres
still turning out their terrified wood,
in the case of the concertina wire
hurled out in exuberant spirals and set down
between rich and poor, in the case of the howls
that fly off the earth through madhouse windows,
in the case of the word "heavenly"
when we remind ourselves that earth,
too, was a heavenly body once,
in the case of the numeral keys
totting up the number of humans
humans have killed, in the case of the man
who strays into a gravitational field where
the differential between the force on the scalp
and the force on the foot sole will stretch him
into an alimentary canal thin as a thread,
in the case of the child who has upset
his ink bottle while doing homework
and quickly snaps both arms down
to halt the lateral gush of the black juices,
gravity, if it could, would recuse itself.

*—Galway Kinnell*

the driveway out like it was snow," Schuder said. The sand buried the trees in their back yard, and it buried their fences. Their dog walked right up a dune and off the property.

A few days later, Lauer went to Lancaster to test the area around the prison. At a housing development nearby, she saw kids biking down little earthen mounds they had built, stirring up powder puffs of dust. As she approached a stoplight, a dust cloud came up suddenly from the southwest. Within two seconds, the light was obliterated; after another few seconds, the cloud was gone. "That happens there all the time," she told me. "The soil was really loose. When you go home after sampling, you can taste the dust."

How many spores does it take to get sick? What role does weather play? What is the best way to identify a cocci infection? To treat one? The diagnostics in use were developed in the thirties. Wetting the ground—a practice that, Lauer points out, can cause more cocci to bloom in the following dry season—is still the most commonly used form of remediation. Some of the leading scientists studying cocci are in their eighties, working on problems that troubled them as graduate students.

Vaccine research has been particularly vexed. Fungi are complex organisms, genetically closer to humans than bacteria or viruses are. Charles E. Smith and his colleagues began, in the fifties, working toward a vaccine, which they tested on themselves without adverse side effects. But the first widespread human trials, in Bakersfield in the eighties, failed to prevent people from acquiring the disease. The second attempt, sponsored by the Valley Fever Vaccine Project, a community effort similar to the one that led to the Salk polio vaccine, yielded a substance that couldn't be formulated to F.D.A. standards.

Fluconazole, the medication most commonly prescribed to cocci patients, can cost up to three thousand dollars a month, and doesn't destroy the fungus but merely keeps it in check. At the University of Arizona in Tucson, John Galgiani is attempting to develop a drug that will actually kill it. Trim and avid—a youngster, at sixty-seven—Galgiani is a partner in a company that is trying to ready a molecular byproduct of the bacteria streptomyces, called nikkomycin Z, for the marketplace. It works by destroying the spherule's ability to make chitin, which forms the protective wall; without it, the disease can't progress.

Nikkomycin Z was discovered in the seventies and is still several years and millions of dollars away from being available. A corporate partner could accelerate

the time line, but as long as valley fever is perceived as a regional disease the market will likely seem too small for a pharmaceutical company to bother with. "We sometimes talk about wishing a President or former President would get cocci," Galgiani told me. For now, the most likely source of a celebrity case is Major League Baseball, which sends a thousand players to Arizona every spring. In 2012, Ike Davis, a first baseman for the Mets, was given a diagnosis of cocci after an X-ray of his chest showed abnormal markings—like crop circles. The cocci made him dizzy, winded, and weak. "I wasn't able to work, couldn't lift that much or take as many ground balls," he said. The team maintains that the illness didn't contribute to a batting slump he subsequently experienced, but the same is not true for Conor Jackson, a former Diamondback, whose major-league career ended after he was given a diagnosis, in 2009.

The regionality of cocci is only partly to blame for the pace of research. In the lab, cocci presents a serious hazard. Early on, laboratory infections were common; a grad student would open a petri dish and, *whoosh*, millions of spores would go up his nose. (After farm work, lab work was considered to have the greatest occupational risk; at Stanford, a center of valley-fever research, a group of obstetrics students got it, though their classroom was two stories above the cocci lab.) At the county public-health building in Bakersfield, I saw a slide of cocci, recovered from a patient's sputum and fed agar, potato extract, and sugar. Angled in a test tube to reduce surface area and stored in a bio-safety cabinet (air flow, straight up), the slide was covered with a cloudy gray smear, like a spiral galaxy. "Here he is," the lab director said. "Just looks like a little bread mold. He's making arthrospores in there, and if we opened it we'd just get a little invisible cloud of infectious particles." Cocci researchers typically work in Bio Safety Level 3 labs: HEPA-filtered air, seamless floors and ceilings, closed antechamber. Until last year, *C. immitis* was listed as a Select Agent. After culturing it, lab technicians had seven days to report to the Department of Homeland Security that it had been destroyed.

In Tucson, Galgiani took me to see the university's Bio Safety 3 lab. In the corridor, you could hear an autoclave grinding like a hotel icemaker, sterilizing every piece of lab equipment and protective gear that came into contact with the pathogenic agents inside. In addition to cocci, the lab handles monkey pox, mouse pox, West Nile, and chikungunya, a mosquito-borne virus for which there is currently no treatment. On the wall was a group of manometers. Galgiani checked that the pressure in the rooms was lower than that in the hall: a containment strategy.

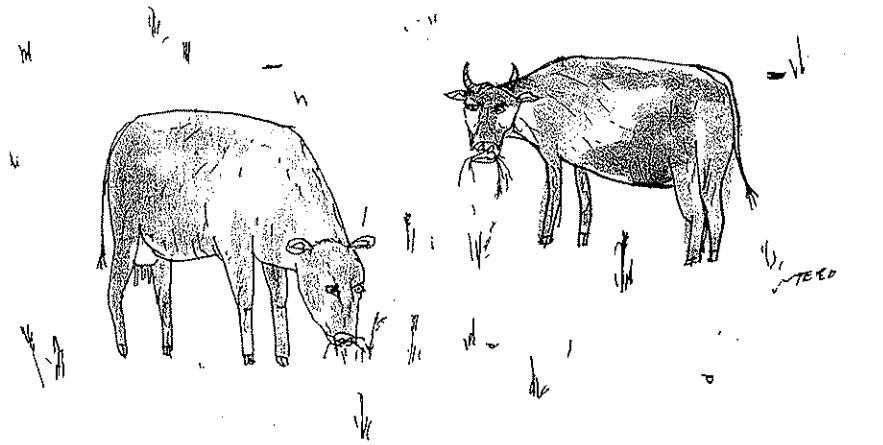
"In the nineteen-fifties, both the U.S. and the Russians had bio-warfare programs using cocci," he said. "Generals can't control agents that rely on air currents to disperse them, and it was difficult to use the vector precisely, so it fell out of favor. But terrorists don't care about that stuff—all they care about is perception. A single cell can cause disease, and you can genetically modify it to make it more powerful." He held up his wallet to a sensor by the door, then put his finger on a fingerprint reader. "The atrium is as far as we get," he said as we stepped inside. "When you work like this, everything slows down, for safety reasons. It's a harder kind of research to do."

The most promising pathway toward a vaccine may lie with Marc Orbach, a fungal geneticist with a shaggy beard and a shuffly manner, who works in the Bio Safety 3 lab in Tucson. Investigating the genes in cocci that activate when it enters a host, he discovered several that were involved in spherulation. When he removed those genes and inoculated lab mice with the treated cocci, they showed no signs of disease. When he hit them with unmodified cocci, they continued to thrive. Because the vaccine is a live attenuated strain, the process of F.D.A. approval—and public acceptance—will likely be lengthy. If Orbach can secure the funding, he plans to try the vaccine in dogs, which are intensely susceptible and are subject to the more lenient regulations of the U.S.D.A.

At the end of September, Representative McCarthy convened a symposium on valley fever in Bakersfield. Victims filled the seats and crowded around the doors, and were invited to share their stories. "It's eating my bones," a middle-aged African-American man called from the back of the room. "It's coming through my skin. I got laid off, so I'm unemployed. I can't afford my medicine. Caught it working in the oil fields. Who do I talk to, that's what I want to know?"

"Erin Brockovich?" someone in the audience suggested.

McCarthy had mustered considerable political power, including the director of the National Institutes of Health and the director of the C.D.C. That afternoon, the three men announced the



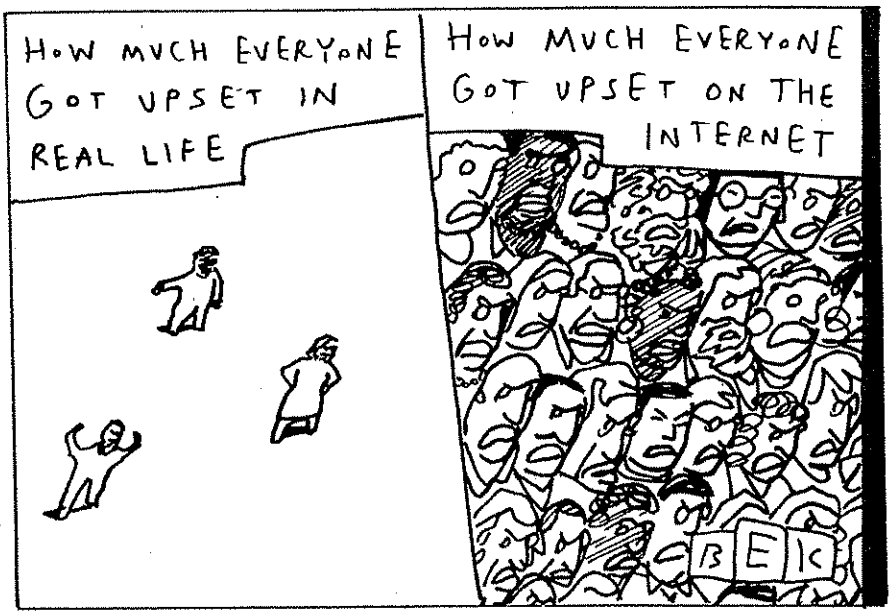
*"If you could eat only one type of grass for the rest of your life, what would you choose?"*

most significant public investment in valley-fever research in many years. The money will fund a large clinical trial, to be held in Bakersfield, that will establish something cocci doctors have never had: treatment guidelines based on scientific evidence.

One day in November, Ramon Guevara headed to Lancaster to attend a meeting about the solar projects, with, among others, members of the Dustbusters, a task force formed under F.D.R. to combat the problem of fugitive dust. Small and thickset, with jet-black hair, Guevara wore a square-shaped suit and a pair of purple-tinted Ray-Bans. His car was the cleanest I have ever travelled in; the lone sign of use was a sanitizer wipe in the passenger-door pocket. Although he is no longer in the Health Department division that deals with cocci outbreaks, he continues to make trips to the area. The stakes are high for him: a Filipino man, he is genetically susceptible to serious forms of the disease. He does his best to hide his concern. "I can't go in there in a space suit," he said. "That would alarm them." As we dropped into the valley, dry, taupe-colored hills on either side, he said, "If this were the Wild West and I were sheriff of the town, I'd just get a wooden board and say, Beware of Dust. Enter at Your Own Risk."

After the meeting, we went out to see the prison, a barbed-wire complex bordered by a small field of solar panels. Across the street was a housing development called Copper Moon, by KB Homes. The houses were big and beige, stark blocks against a bright-blue sky. A billboard advertised the units, with solar included, "from the low 300's." Guevara looked depressed. "There are cases there," he said quietly. "And see this?" He pointed to an adjacent empty field. "Watch, all this will turn within a couple of years." As we drove away, I caught sight of a sign bearing the city's obsolete slogan: "Lancaster: It's Positively Clear." By mid-December, Lauer had reported preliminary results: the sites around the prison tested positive for cocci.

With the Southwest drying out and heating up, and development pushing deeper into uninhabited terrain, the range of cocci is likely to increase. But other factors may aggravate its impact, too. With more and longer-lived transplant patients and a proliferating set of indications for immunosuppressive drugs, researchers expect to see an acceleration in the number of life-threatening cases. "As we as a population become more immunosuppressed, we become at higher risk," Tom Chiller, a fungal expert at the C.D.C., said.




Cocci is still overwhelmingly a local disease. But, in the air as in the body, spores can go anywhere they want: in shipping containers to Hong Kong, in donated organs to unwitting transplant patients. Ken Williamson is a forty-four-year-old software designer in Grand Rapids. Twenty years ago, after learning that he had a common auto-immune disorder, he started taking medicine that affects his immune system. Otherwise, he is active and healthy—"an average white guy from Michigan," he says.

This past spring, Williamson heard about a great deal on a used car, a 2000 silver Ford Taurus being sold by a Canadian couple who lived near his in-laws' house, in Phoenix. He bought the car for a thousand dollars, and his father-in-law delivered it to Michigan. The car's ventilation system needed a little work—Williamson had the filters and the fan replaced—but soon he was driving it to his job, and he installed car seats for his two toddlers in the back.

Williamson had given up chocolate for Lent, and on Easter he broke the fast. The next morning, he woke up to find a little pimple on the left corner of his lip: the wages of his indulgence, he thought. But the bump grew and grew. He Googled "big sore on lip" and, horrified, went to a doctor, who gave him cold-sore medication and, later, antibiotics. The sore continued to grow, until it was rough and as big as a nickel. His friends nicknamed it Lumpy. At work, he covered it with a Band-Aid; he tried concealing it with his wife's makeup before going to church. "It looked like I got hit by a bullet," he told me. "The skin was bright red and thickened, and it would weep a pinkish clear liquid." After a couple of months, he went to a dermatologist, who told him that he had cocci.

Treatment with fluconazole caused Williamson's lesion to shrink and eventually all but vanish, and no new lesions have appeared, nor has he had the lumbar back pain and the headaches that would indicate dissemination to the spine and the brain. He feels that he got lucky, but his treatment is ongoing. The infectious-disease specialist who is treating him said, "I have a hard time relaying to him how concerned I still am." Williamson sold the Taurus, without disclosing that it was the suspected source of infection. "We talked a lot about it," the doctor told me. "We were going to call Click and Clack at 'Car Talk.' The car itself is not dangerous, unless the buyer is immune-compromised. Which is then true for any car sold to anyone out of Arizona." ♦