Science & Technology

The Gas Menagerie

Josh Fox's documentary *Gasland* triggered a groundswell of opposition to fracking, the technology driving America's gas-drilling boom. Now, as the industry hits back, Fox and other Columbians are digging in.

By
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|
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A natural-gas drilling site in northeastern Pennsylvania (Mark Ovaska / Redux)

"When you think of this as insanity, it is." — Josh Fox at an antifracking rally in Los Angeles, May 2012

They’re out there.

Two men with white mustaches in blue California casuals stand at the back of a group of fifty people on a green soccer field atop a bluff overlooking America’s largest urban oil field. Beyond, the city of Los Angeles unfurls in ledges and promontories of pink-and-salmon rooftops, white walls, and barren palms, a fabric sewn together with utility wires and mountain scrub, a brittle blanket flung over a rickety bed. The sun burns hard in the gas-blue sky. Below, on the parched, brown hills of the thousand-acre Inglewood Oil Field, hundreds of black pump jacks work the strata, their hammerhead-shaped weights nodding over the ground like prehistoric birds pecking for the last drops.

Up on the soccer field, in the Kenneth Hahn State Recreation Area, Food & Water Watch holds a press conference to kick off a statewide antifracking campaign. A lectern stands in the grass. A few feet behind it, people from communities around the Inglewood Oil Field hold placards that spell out GOVERNOR BROWN, STOP THE INSANITY. BAN FRACKING NOW.

The word fracking, short for hydraulic fracturing, has had a semantically complicated life. Strictly speaking, it describes a well-stimulation technique in which millions of gallons of water, sand, and chemicals are injected at high pressure more than a mile underground to open fissures in shale rock and release trapped gas. But to fracking opponents, the term signifies the whole production process enabled by hydraulic fracturing and horizontal drilling, which have allowed companies to tap gas deposits inaccessible through conventional vertical drilling. This wider process covers well boring, well casing, wastewater disposal, land clearing for well pads and pipelines, infrastructure building, methane flaring, sand mining, and heavy trucking.

Now, in the noonday heat, a man walks to the lectern. He wears a gray Yankees cap, black Simple Shoes, a dark-blue hoodie, and knockoff Wayfarer specs, suggesting a cross between a young Elvis Costello and a late-period Beastie Boy.

People clap and cheer. The men at the back clap, too.

The speaker speaks. “I’m happy to be here for the ribbon-cutting ceremony of the work-over rig right behind you,” he says, referring to the yellow derrick rising into view from the gulch below. East Coast irony glints briefly in the California sun. He goes on: “We’re at a moment where every trend in the world is to move away from fossil fuels and toward renewable energy — solar, wind, hydropower, geothermal. To

be taking steps backward in the heart of *Los Angeles*? I wish I could say that this was unfamiliar and strange to me as an emissary from New York and Pennsylvania, where the proposal was to frack in the New York City watershed and the Delaware River basin."

The emissary is Josh Fox '95CC, a theater director and filmmaker whose movie *Gasland* pushed fracking onto the national stage. Ever since *Gasland* aired on HBO in the summer of 2010, Fox has spent much time in front of microphones in shale-striding states — at colleges, rallies, concerts, town meetings, and anyplace else where people come together to oppose gas drilling. Advocates of fracking tout jobs (for engineers, welders, pipefitters, food-service workers, lawyers, realtors), energy independence, a cleaner-burning alternative to coal and oil, lower energy costs, and, through the leasing of mineral rights, financial relief for people who really need it. The industry says fracking is safe. Yet to Fox, the whole thing seems absurd, surreal, a tragedy made ridiculous by the "what could possibly go wrong?" setup and an all-too-foreseeable denouncement.

"We're here over the Newport-Inglewood fault," Fox says. "Earlier this year, I toured central Arkansas with *Nightline*, visiting a series of towns that had suffered a thousand earthquakes in a year due to injection wells and fracking. The earthquakes ranged from the very small to a 4.7 that cracked the walls of a school."

The two men at the back shift their weight, watching Fox with pleasantly mild expressions of attentiveness.

"This is insane," Fox says, "to be thinking about fracking in the fault lines of Los Angeles."

You don't have to watch *Chinatown* nine times to know that water is everything in LA, and Fox doesn't dwell on the most conspicuous threat — the contamination of the city's drinking water due to some wildly improbable scenario, much like the Fukushima Daiichi nuclear disaster or the BP blowout in the Gulf or the Baldwin Hills dam collapse right here in what is now Kenneth Hahn Park or the methane-tainted drinking wells in Dimock, Pennsylvania, or the earthquakes last winter in Youngstown, Ohio. Nor does he rattle off the health problems that the oil field's neighbors claim to have endured since 2006, when the Houston-based energy company Plains Exploration & Production (PXP) began restimulating the Inglewood wells after years of falling production. No, for Fox, it's the fracking-in-a-major-fault-

zone angle that really captures the magnitudes.

“It’s an absurdity of the kind that is all too regular back East, where the audacity, the bullying, the level of impunity under which these companies operate can be rather astounding.”

The two men glance down at the grass. When Fox is finished, they join in the applause.

One of the men then approaches someone nearby who is scribbling on a pad.

“Hi. Are you a reporter?”

“More or less.”

“I’m from the California Independent Petroleum Association, and we’re out here to let people know the truth. You can’t believe what you hear in *Gasland*.” The man hands the reporter a flyer containing quotes from regulators and engineers denying any proven link between fracking and groundwater contamination. “I mean, why on earth would you want to ban something that brings jobs and prosperity and better air, and can free us from Mideast oil, and that we’ve got in abundance? Why would you want to stop something like that?”

“What about those earthquakes in Ohio —”

“That had to do with a reinjection well. Not with fracking.”

“But wasn’t it wastewater from fracking?”

“Give Rock a call.” The man hands the reporter a card. “Rock will be glad to answer any questions.”

“I heard there’s a school next to the oil field that has sixty inhalers for students with asthma —”

“Call Rock.”

After the press conference, Fox, his video camera in hand, chats with local activists and poses for pictures. Then he walks across the soccer field to the parking lot. He doesn’t notice the industry men, but when someone tells him that they were in attendance, Fox isn’t surprised.

“They follow me around,” he says dryly. But you can hear the faintest tremor underneath.

Who’s Afraid of Pennsylvania Fox?

> *“Pennsylvania is getting fracked to hell. It’s a disaster area.”*
> — Josh Fox, May 2012

> *“Gasland seeks to inflame public opinion to shut down the natural gas industry .... The film presents a selective, distorted view of gas drilling and the energy choices America faces today.”*
> — John Hanger (D), former secretary of the Pennsylvania Department of Environmental Protection

> *“The myth that terrible chemicals are getting into the groundwater is completely myth. It is bogus.”*
> — Michael Krancer (R), current secretary of the Pennsylvania DEP

> *“The Pennsylvania Department of Environmental Protection has been wholly captured by the natural-gas industry. I don't think there's any question about that.”*
> — Susan Kraham, senior staff attorney at Columbia Law School’s Environmental Law Clinic

> *“If the specific identity of a chemical, the concentration of a chemical, or both the specific identity and concentration of a chemical are claimed to be a trade secret or confidential proprietary information, the vendor, service provider, or operator may withhold the specific identity, the concentration, or both the specific identity and concentration of the chemical from the information provided to the chemical disclosure registry.”*
> — from House Bill 1950, or Act 13, signed by Pennsylvania governor Tom Corbett (R) on February 14, 2012

When the fox came to the henhouse — no, when the landsman came to the Fox house, the story took a turn. The gas boom hit a bump. The letter arrived on a spring

day in 2008, the landsman never knowing that the fellow studying the fine print from under the brim of his Yankees cap in the red house in Milanville, Pennsylvania, was the founder and artistic director of International WOW, a New York– based film and theater company devoted to creating work addressing political and social crises; and even if he had, he might reasonably have assumed that anyone in so unremunerative a business as the avant-garde theater would find his offer a godsend: nearly five thousand dollars per acre to frack the property. At nineteen and a half acres, that was almost a hundred grand. All Fox had to do was sign.

But Fox, unlike many in northeastern Pennsylvania, had no hungry mouths, no failing farm, no mortgage arrears, no crushing medical bills. His parents had built this house in the woods near the Delaware River the year Fox was born, and while the money would certainly have been useful, the prospect of his own tabernacle of wood and stream being transformed into a gas field bestirred the man's inner Thoreau, not to say his inner Rachel Carson. "I woke up one morning in 2008 and declared myself a journalist," Fox later wrote. "I had to. My home was under siege by the gas-fracking industry. I felt that I had to not only seek out the true effects on public health and the environment of the largest onshore natural-gas drilling campaign in history but also to report what I found to my community."

So he made *Gasland*, a real-life disaster movie in which people who live near fracking sites in Dimock, Pennsylvania, and in Colorado and Wyoming, experience headaches, nausea, sick livestock, contaminated well water, flaming faucets, neuropathy, tumors, brain damage. The gas companies deny blame, regulators appear ineffectual if not compromised, and lessees with health problems and buyer's remorse fear retaliation for speaking up. We learn that fracking fluids contain proprietary mixtures of hundreds of chemicals, including known or suspected carcinogens (benzene, toluene, xylene), and we see postcard-perfect images of Western landscapes that have been pocked and punctured with well pads and derricks.

Gasland won the 2010 Sundance Special Jury Prize, got picked up by HBO, was later nominated for an Oscar, and turned Fox, the film's sharp, droll, banjo-picking narrator, into a kind of environmental pop star. Rather than let HBO do all the work, Fox hit the road: for the next year and a half he toured two hundred cities around the United States and ten countries. He screened *Gasland*; sat on panels with scientists, educators, and actors (Alec Baldwin, Mark Ruffalo, Scarlett Johansson); and did solo stuff, delivering dead-funny, dead-serious monologues enumerating the

perils associated with fracking and noting that “even if you were to get all this gas out perfectly safely, and everyone was really happy with the process — even if nobody got sick from it — we’d still have a huge problem with burning another twenty, fifty, hundred years’ worth of fossil fuels.” Eager crowds turned out wherever he went, and Fox, amazed, found himself at the heart of a grassroots movement largely of his own making.

Not everyone went gaga for *Gasland*. To his critics, Fox was an alarmist, an agitator, a master of innuendo, a manipulator of facts, an ends-justifies-the-means trickster bent on destroying the energy future of a nation that President Obama has called “the Saudi Arabia of natural gas.” The gas industry tried to discredit Fox by zeroing in on *Gasland*’s alleged inaccuracies, particularly the case of a fire-breathing kitchen faucet in Weld County, Colorado, which the movie implies was caused by fracking but which the Colorado Oil and Gas Conservation Commission determined was the result of naturally occurring methane in the landowner’s water well.

This past March, Teddy Borawski, the chief oil and gas geologist for Pennsylvania’s Department of Conservation and Natural Resources, compared *Gasland* to Nazi propaganda. “Joseph Goebbels would have been proud,” Borawski told an audience in Lancaster County. “He would have given [Fox] the Nazi award.” Fox, whose father and paternal grandparents survived the Holocaust, wrote an open letter to journalists condemning the slur and calling on Governor Tom Corbett to take action: “If the Corbett administration fails to fire Borawski and fails to begin a real assessment of the effects of gas drilling on the state, then certainly the Corbett administration has lost all credibility and legitimacy.” Borawski made a public apology and kept his job.

A month earlier, on Valentine’s Day, Corbett, who according to the nonpartisan National Institute on Money in State Politics received $1.3 million in campaign funds from the oil and gas industry, signed Act 13 into law. Act 13, among other things, stripped municipalities and townships of zoning authority for gas drilling and gave it to the state. Dozens of Pennsylvania towns that had attempted to regulate fracking saw their local zoning ordinances overturned. It seemed that *Gasland*’s indictment of Pennsylvania’s modern-day Gold Rush had failed to impress the state legislature. With the new law, Pennsylvania managed to justify *Gasland*’s paranoid visions and to exceed them.

Columbians on the Case

The fracking question has made for busy times at Columbia's Environmental Law Clinic. The clinic, an academic program run by law professor Edward Lloyd and senior staff attorney Susan Kraham '87CC, '92LAW and staffed by twelve to twenty law students, is representing clients in drilling-related cases involving air pollution exemptions, the Tennessee Gas Pipeline, the Delaware River Basin Commission (a regional regulatory body that includes four states and a federal representative), and, not least, Act 13.

"Pennsylvania had been litigating for years over the scope of municipal authority to limit the production of natural gas," says Kraham. "The Pennsylvania Supreme Court made it clear that while municipalities couldn't regulate the operations, they could regulate their location. Act 13 essentially says, gas drilling can happen anywhere."

On April 4, 2012, in Harrisburg, Kraham and three other attorneys representing eight Pennsylvania townships and counties, a doctor, a town supervisor, and the nonprofit Delaware Riverkeeper Network filed for a preliminary injunction against the new zoning rule.

"People have basic property rights under the Fifth Amendment and the Fourteenth Amendment," Kraham says. "Those rights can be limited by zoning under very old federal law, to the extent that zoning is adopted to protect the public health and welfare. If I own property in a residential neighborhood and the municipality tells me I can't put in a metal-plating facility, that's because keeping that kind of facility away from a residential area protects the public health. It's been understood that that is an acceptable restriction on private-property rights. The state of Pennsylvania has now impacted people's private-property rights. But has it done so on the basis of public health and safety? We would say no. Putting a compressor station or a drilling rig three hundred feet from a public school or three hundred feet from my house affects my property rights in ways that don't protect the public health.

"The question is, does the state have the authority to do this? It undercuts everything we've come to understand about zoning and local authority."

The state's argument, according to Kraham, is that the legislature has the authority to determine policy statewide, and has decided that the development of natural gas is in the state's interest, and that the municipalities' authority can be restricted.

But, Kraham says, “Pennsylvania’s constitution has a provision giving people the right to a safe and clean environment. One of our claims is that the state is preventing municipalities from exercising their obligation to protect the environment. Another claim is that, under the Pennsylvania constitution, the legislature can’t adopt what is called a special law, meaning that you can’t adopt a law that applies to just one person or just one industry. Every other industry in Pennsylvania is subject to zoning. This one isn’t.”

Meanwhile, law students in the clinic have traveled to towns like Towanda in north-central Pennsylvania to see drilling operations and their effects firsthand. Andrew Kirchner ’09CC has been examining fluid-disposal issues, specifically, the enormous wastewater pits that have bloomed on farms and fields. Of the two to eight million gallons of fluid pumped into a well for a frack job, about half flows back up.



A drill site in Forest Lake, Pennsylvania (Amy Sussman / Corbis)

“These wastewater impoundments are being used in ways that are hazardous to the environment and human health,” Kirchner says. “Some impoundments have no fences. There are ripped liners and liners held down by bags of concrete, and conditions where the water table rises above the base of the impoundment and takes on polluted water. Frack water is really noxious. If you live within a thousand

yards of it, you can smell it, and it can give you nosebleeds and make you dizzy.

“One of the most dramatic things we saw was an impoundment in the backyard of a house. This is a populated area. You see house, drilling operation, house, drilling operation. There are compressor stations, well pads with five to ten trucks, huge derricks. At dusk, they bring in floodlights, and the drilling is really loud. People can’t sleep.

“There is pipeline activity everywhere: bulldozers clear wide swaths for the pipelines. These are state forests, state game lands, and they’ve been cut up. This is a beautiful part of the country, and the amount of industrialization is hard to believe.

“But the big shock for all of us was the truck traffic. Every other vehicle is a tanker truck. The trucks go from the impoundment to the well site back and forth, day and night. They suck up water from ponds and streams, they drive to injection sites in Ohio to get rid of the waste. They have created such deep grooves in the road that the bottom of our car was scraping the road and got stuck.”

Yet for all this physical evidence, it was a section of Act 13 that really drove the message home for Kirchner.

> 11) If a health professional determines that a medical emergency exists and the specific identity and amount of any chemicals claimed to be a trade secret or confidential proprietary information are necessary for emergency treatment, the vendor, service provider, or operator shall immediately disclose the information to the health professional upon a verbal acknowledgment by the health professional that the information may not be used for purposes other than the health needs asserted and that the health professional shall maintain the information as confidential. The vendor, service provider, or operator may request, and the health professional shall provide upon request, a written statement of need and a confidentiality agreement from the health professional as soon as circumstances permit.

“It’s brazen,” Kirchner says. “Limiting what a doctor can discuss with a patient or other doctors — that’s beyond everything for us.”

The Chase

Just after the LA press conference, Fox and his video camera get into the back seat of a car belonging to Chris Paine, director of the 2006 documentary *Who Killed the Electric Car?* Paine lives in nearby Windsor Hills and is acquainted with the fumes of the rekindled oil field.

As Paine cruises down a winding parkland road and onto South La Cienega, Fox sees something coming toward the car: a big red-and-gray tanker truck, and another one behind it. “Halliburton!” Fox says, bringing his camera to his eye. The trucks pass — Oklahoma plates, ACID printed on the bumpers, hieroglyphs of hazmat warnings on the sides. A fresh current runs through Paine’s electric car. “Let’s follow them,” Fox says. Paine does a nifty U-turn, and Fox is half out the window with his camera as the little car pulls alongside the eighteen-wheeler. “This is one of my favorite pastimes,” Fox says merrily into the wind. “Chasing Halliburton trucks!”

Halliburton, energy-services giant, innovator and implementer of hydraulic fracturing and horizontal drilling, and, as *Gasland* reminds us, prime beneficiary of the Bush administration’s 2001 energy task force chaired by US vice president and former Halliburton CEO Dick Cheney, who pushed for the 2005 energy bill that exempted fracking from the Safe Drinking Water Act of 1974 and the Clean Water Act of 1972 — yes, *that* Halliburton — manifesting itself in full armor on the streets of LA. What are they up to? The truckers are as oblivious to Paine’s car as a ship is to a barnacle.

“Got ’em,” says Fox, drawing back into the car. Paine turns at the next light, and the trucks head off to an undisclosed location somewhere in the hills of the Inglewood Oil Field.

Waiting for Cuomo

> *“Geologists estimate that the entire Marcellus Shale formation may contain up to 489 trillion cubic feet of natural gas throughout its entire extent. To put this into context, New York State uses about 1.1 trillion cubic feet of natural gas a year.”*
>
> — NY Department of Environmental Conservation (DEC), 2011

> *“Our two chief economies in New York State are tourism and agriculture. Those are two things that can’t happen in a gas field.”*

— Josh Fox

Two weeks before Los Angeles, Fox unplugged himself from an editing room in New York where *Gasland 2* was under construction (according to Fox, the new movie will focus on “the contamination of our political system by industry lobbying and influence”) and drove up to Albany to testify at a state-senate hearing on fracking. On the way, he spoke about the state of the state.

“New York is facing a crucial decision on whether or not to allow the gas industry in,” he said. “With all the leasing that’s been going on in the Southern Tier, the amount of gas wells would be between fifty thousand and a hundred thousand, throughout 50 percent of New York State. This is the greatest environmental and economic issue facing the state in its history.”

In 2009, the New York DEC released an environmental-impact statement on gas drilling in the state. The report included a recommendation that drilling be permitted in the New York City watershed. This did not sit well with the water-huggers. That one of the world’s last great unfiltered water supplies, the drinking source for ten million people, should be exposed to risks of irreversible harm by an agency charged to protect it, was enough to draw thirteen thousand public comments to the DEC website (the previous record was a thousand). A revised study was undertaken. Then, last summer, Governor Andrew Cuomo, between a rock and a hard place, let a de facto moratorium on fracking expire, while agreeing to spare the watersheds of New York City and Syracuse. In September, the new DEC report was released, and this time more than sixty thousand comments poured in. Critics felt the statement failed to fully consider the potential effects on human health, and demanded a separate health study.

Final regulations may be handed down this summer.

“Why are we, in the twenty-first century, going on a statewide campaign to develop fossil fuels?” Fox continued. “We know that we have to get off fossil fuels. And we also know that renewable energy can run the state. So here’s the thing: we’re at this moment of real decision. A lot of politicians are very afraid of the repercussions of taking on oil and gas, but they’re simply on the wrong side of history.”

In early June 2012, the DEC floated a proposal that fracking be allowed in a few struggling counties on the Pennsylvania border, by local consent. Then, on June 20, two years to the day after the HBO debut of *Gasland*, Fox released, on the Internet,

an eighteen- minute video called *The Sky Is Pink*. In it, Fox, using the gas industry's own documents, demonstrates how gas drilling and fracking can indeed result in the contamination of drinking water, and appeals directly to Governor Cuomo to protect the entire state. This position is summed up in the video by Democratic state senator Daniel Squadron, who says, "When it became clear very quickly that drilling would be insane in the New York City watershed, the next question gets asked by the public automatically: 'If it's not safe for the New York City watershed, why is it safe for someone else's?'"

Before there was *Gasland*, there was Hancock.

In 2009, Columbia's Urban Design Lab produced a remarkable document called "Hancock and the Marcellus Shale: Visioning the Impacts of Natural Gas Extraction Along the Upper Delaware," which gave a clear and thorough assessment of natural-gas drilling's likely effects on the economy and environment in the Delaware River watershed.

The lab's director, Richard Plunz, who is a professor in the Graduate School of Architecture, Planning, and Preservation, has a home in Sullivan County, New York, in the region of the Marcellus Shale formation, which underlies parts of New York, Pennsylvania, Maryland, West Virginia, Kentucky, and Ohio.

The report projected the town of Hancock as a "ground zero" for potential fracking in the Western Catskill region of New York State: "It's where Route 17 meets the railroad, the river, and Route 97, which goes up the New York side," Plunz says. "The railroad is important because you can haul fracking sand in and fracking fluid out of there. You also have the Delaware River and a lot of other surface water. So it was an obvious place to lease land."

By 2009, a quarter of the land area in Hancock had already been leased for drilling.

"The Upper Delaware is protected by the National Park Service as a wild and scenic river," Plunz says. "It's an eagle sanctuary, and has some of the best trout fishing on the East Coast. This creates a conflict over the protection of water resources. The water is there, obviously, and the gas industry will need it. New York City has said, No way. New Yorkers don't want their water system to be touched. People assume that the New York City restrictions will hold, legally. But then there's the whole rest

of the region.

“Many questions involve land values and property taxes. If there’s a lease on your land, your property is devalued. People didn’t understand that initially. They were told by the gas-company landsmen, ‘You’re going to make a fortune, and you won’t even see a well.’ But even without a well, nobody is going to buy property that has a lease. The value of the neighbors’ property probably decreases, too. No one wants to buy a house in an industrializing landscape.

“The long-term economic prospects for these towns are diminished. The land will be undesirable, scarred with roads and well pads and possibly contaminated. The owners will have collected their proceeds from the production as long as possible, but when the profits end they can simply walk away. With that, the town’s tax revenue fades.

“I live in the town of Lumberland, and am a member of the planning board. Next door is the town of Highland. In Highland, almost four thousand acres of land have been leased. There is a preserve of seventeen hundred acres with a sizable pond. The owners stocked the pond with trout, and they had a big restaurant and people went there and fished the trout, and the trout was cooked at the restaurant. It was a pretty big business. Then the owners leased the land. The pond will make a good water source for the fracking.

“Highland’s four thousand acres are adjacent to the new Millennium Pipeline, needed to haul the gas out. Nearby there are road improvements, like a new heavy-duty bridge across the Delaware connecting New York and Pennsylvania. They’re also building feeder pipelines. The infrastructure is moving ahead. The industry figures that it’ll prevail, and there’s only citizen opposition to stop it. Unless Cuomo really puts his foot down.”

What Goes Down Must Come Up

“The gas industry tells the public it’s safe because they’re extracting the gas so far below the ground surface that any contaminants they use will never make their way up to an aquifer. But that assumes that the gas well is properly developed and sealed. If it’s not, contaminants have a pathway to migrate into upper aquifers. And once you’ve polluted an aquifer, it’s almost impossible to undo the damage.”

— Patricia Culligan, professor of civil engineering and engineering mechanics, Fu Foundation School of Engineering and Applied Science

Days after his trip to Albany, Josh Fox entered a lecture hall packed with 150 students at Goucher College in Baltimore. The mostly female audience, rich in multicolored hair and nose rings, giggled and whispered as Fox took the stage ("That's Josh Fox!" "He's so *sexy*!"). You might have thought he really *was* a rock star. *Jumpin' Josh Fox, he's a gas, gas* —

It's not far-fetched. In high school, Fox performed in rock bands as a drummer, and soon turned to the theater. At seventeen, he directed his first play, Tennessee Williams's *The Glass Menagerie*. (He played Tom.) He majored in theater at Columbia, where he studied with the avant-garde experimental-theater director Anne Bogart and the Shakespeare scholar Edward Tayler. "Every story structure that's two hours long goes back to Shakespeare," Fox has said. "When you read Shakespeare in one year, two semesters, when you read every last play and every last sonnet, and you do that with Edward Tayler, boy, you understand dramatic structure after that."

Now, at Goucher, Fox, his banjo resting on a table behind him in its battered case, speaks not of rock, nor *Glass*, but of another favorite: cement.



Household water samples, Dimock, Pennsylvania (Amy Sussman / Corbis)

“In the town of Dimock, the first place I visited in the film, the Pennsylvania Department of Environmental Protection showed that the problem was with the well casing. The well gets drilled, then they case the outside of it with cement to protect the groundwater. That cement is one inch thick, and has to go thousands and thousands of feet. Anyone ever worked with cement? You might want to learn a little bit: the job market is not so good. I worked a lot with cement as a contractor. Cement! It cracks all the time. Cement doesn’t want to cooperate at all. The industry’s documents show that 6 percent of these cement casings, which protect the groundwater, fail immediately upon drilling. Forty percent of the casings in the Gulf of Mexico are leaking. If you read the presidential report on Deepwater Horizon, what happened? Cement failed, and the whole thing blew up. The gas industry itself — not some independent scientific commission, not the Center for American Progress, not Cornell or Goucher or Columbia, but the gas industry — admits that 50 percent of well casings fail over thirty years. How long does a gas well have to last?”

“Forever,” comes a shout.

“Who said forever? Yes! Forever! We have to protect the groundwater forever because the chemicals will stay down there — forever.”

Tomorrow, and Tomorrow, and Tomorrow

> *“We have a supply of natural gas that can last America nearly one hundred years, and my administration will take every possible action to safely develop this energy.”*
>
> — President Barack Obama (D), State of the Union address, January 24, 2012

A hundred years isn’t forever, but for a natural-gas supply it seems like an awfully long time. To Fox, packing his bags for Los Angeles, it’s unthinkable: greenhouse oblivion. This bridge to renewable energy is not one that a man wishes to cross.

In 2009, the Penn State geologist Terry Engelder estimated that the Marcellus Shale formation held more than 500 trillion cubic feet of natural gas. The phrase “game

changer” was oft heard, and the bridge to the future soared so high and far it vanished into the clouds. Many people saw a panacea for the nation’s economic and geopolitical ills, but to some, these enormous reserves, reachable now through enhanced technologies, seemed to mock that cheap and bountiful energy source blazing faithfully overhead, its rays now warming the inside of Fox’s rental car as he drives into town from LAX and sees, to the east, the pterodactyls bobbing in the hills of the Inglewood Oil Field.

Maybe he’s not so far from home after all.

How long will they hammer the Marcellus? How much gas does it truly hold?

In a classroom in Schermerhorn Hall, two Columbia geoscientists weigh in.

“Some say that in two years it’ll all be gone,” says geophysicist Roger N. Anderson, the Doherty Senior Scholar at Columbia’s Lamont-Doherty Earth Observatory (LDEO) and an adjunct professor in the Department of Earth and Environmental Sciences. “Others say, ‘Just keep fracking it over and over and over again.’ Nobody knows yet.”

Sally Odland, a former industry geologist and the business manager for the Department of Earth and Environmental Sciences, agrees. “We have no history of production,” she says. “With these new shale gas wells, you get peak production in one or two years, when the pressure is strongest, then a steep fall-off. A few of the older shale plays in Texas and Louisiana, for instance, have done five years of production, so people are predicting, for New York and Pennsylvania, a cumulative production of ten, twenty, fifty years. That’s bullshit. There’s not enough data.”

“The companies are gambling,” says Anderson, who has done work for BP, Chevron, and many other energy companies. “They’ve spent millions in advance. They had to buy the land, do the development, and bring in all the piping.”

“And right now,” says Odland, “because of overproduction, the price of gas is extremely low. Companies are drilling simply to hold position and keep their leases.”

This past January, the US Energy Information Administration, which in 2011 had estimated 410 trillion cubic feet in the Marcellus, revised the figure to 141 trillion — about six years’ worth of natural gas for the United States.

Is that a bridge worth building? Will all end well in the wells?

“I believe that with rules and oversight, and using the best technology and best practices, this drilling can, for the most part, be done safely,” Odland says. “But it’s an industry that will not self-police.”

Anderson nods. “Too much money involved. You’ve got another problem, and it’s the same as in the Gulf with BP: a regulator has to know as much as the driller. They have to be highly educated and highly paid.”

“Yes,” says Odland, “and you’re in a time when states are cutting their budgets. So enforcement is a huge issue.”

“The BP explosion was partly caused by the regulators not doing their job,” Anderson says. “Aside from BP not doing its job. But it’s a very long history. If you let them do whatever the hell they want, we’ll end up with a lot more messes.”

A View from the Ridge

Two hours after his rendezvous with the Halliburton trucks in South LA, Fox goes out to find them again. Two locals take him on a drive along a steep jogging path in Kenneth Hahn Park to the top of a hill. The plateau holds ball fields, playgrounds, and lookout points that command vistas of a vulnerable-looking city long overdue for the Big One.

The driver parks the car and everyone gets out. Fox brings his camera. The air has a chemical tang. It’s the oil fields. Nearby, along a dirt hiking path, some fifty feet from a playground, behind a barbed-wire fence, lies an industrial plant, half hidden by trees. Signs hang from the fence, warning that the forbidden area contains substances known to cause cancer and birth defects.

“What’s going on when you have a sign like this and a playground there?” says Fox, getting all this with his camera. “And the wind is blowing directly toward it.”

Fox is working. His running monologues of casual observation of the absurdities we all take for granted form countermelodies over the cracked juxtapositions sniffed out by his camera. (An example of Fox’s cunning comes early in *Gasland* when, at a hearing on Capitol Hill in which gas executives are testifying to the safety of fracking, the camera tilts down a few inches from the speakers’ heads to reveal, on

the tabletop, a row of plastic water bottles.)

Fox follows his guides along the hiking trail in the hot sun, still filming. The air induces dull headaches, itchy lungs. The party veers off the trail, through some overgrown brush, and into a secluded area of scrubby vegetation. A few feet away, at the bluff's edge, stands another barbed-wire fence. Fox goes to the fence and looks out across the canyon road to the dirt-brown hummocks of the Inglewood Oil Field. There, on the carved-out hill, in plain view, sit the red-and-gray trucks. There are other trucks, too, some outfitted with pumping equipment. The scene has the silent, motionless, furtive feel of a desert deal going down. If the workers at the site look up, they'll see a black speck on the ridge — a man with a camera.

Fox films for a few minutes, then ducks back through the undergrowth and takes the hiking trail back to the car. Just before he reaches the parking lot, he sees, on the side of the path opposite the hazardous-chemical signs, a sign for park safety that says NO GOLF. NO MODEL AIRPLANES.

Fox shoots both sets of signs.

Meanwhile, Back in Pennsylvania

Immediately after Susan Kraham and her colleagues filed for an injunction against the zoning provision of Act 13, the industry pushed back.

"The gas industry moved to intervene in the case and become a party," says Kraham. "The judge said no. The head of the senate and the head of the state assembly also moved to intervene, arguing that they had a 'real interest in the court getting the law right.'"

The judge said no.

Judge Keith B. Quigley was not the original judge in the case. The previous judge had disclosed that he had a gas lease on his property and a partial interest in a drilling company. The petitioners asked for a recusal. Now it was Judge Quigley.

On April 11, 2012, in a courtroom in Harrisburg, Judge Quigley handed down his order.

“The motion,” Quigley wrote, “is granted.” So it was: a 120-day preliminary injunction. “While the ultimate determination of the constitutionality of Act 13 is not presently before the Court, the Court is of the view that municipalities must have an adequate opportunity to pass zoning laws that comply with Act 13.”

The court also expedited the briefing and argument of Act 13 so that it could determine the law’s validity before the 120 days expired.

Governor Corbett’s spokesman, Eric Shirk, betrayed no concern. “All this decision means,” Shirk told reporters, “is the municipalities will get an additional 120 days to come into compliance with the zoning provision of the law.”

Kraham had other ideas. “We want the court to rule that Act 13 is unconstitutional within the 120 days,” she says.

On June 6, before seven judges in the Commonwealth Court of Pennsylvania, the petitioners presented oral arguments on the constitutionality of Act 13.

The stakes could hardly be higher: if the court finds the zoning provisions unconstitutional, it could invalidate the entire law.

Talking to Rock

Rock Zierman is on the line. He’s the CEO of the California Independent Petroleum Association, which calls itself a “nonprofit, nonpartisan trade association representing approximately 450 independent crude oil and natural gas producers, royalty owners, and service and supply companies operating in California.” Zierman, it turns out, doesn’t know much about the activity at the Inglewood oil patch — he suggests contacting PXP, the company that leases the field — but, addressing the notion that fracking on fault lines in a city of millions is “insane,” says, calmly and reasonably, “There are no founded cases of seismic activity due to fracking.”

Zierman is speaking about fracking in its narrowest sense. According to John Armbruster, a retired seismologist at LDEO, fracking, which occurs at shallower depths “where the rocks are weak and not supporting any earthquakes,” is of less concern to seismologists than the associated practice of reinjection: the pumping of wastewater into deeper disposal wells, a process that can last months or years

(fracking takes a few days).



Josh Fox near his home in Milanville, Pennsylvania (Jorg Meyer)

It was Armbruster who, last November, drove to Ohio to set up the seismological instruments that allowed LDEO to accurately measure the Youngstown quakes that occurred weeks later. (State regulators shut down the problem well.) While Armbruster rates the odds of an individual fracking well causing a major earthquake as “tens of thousands to one,” and maintains that “society has to take some risks,” he grants that “the chances of what happened at Fukushima were also minuscule.” And in California, he says, which has a lot of earthquakes anyway, there is room for plausible deniability: “If a frack caused a few earthquakes, it’s easy to say, ‘Well, I don’t think we’re causing these earthquakes. You have no proof.’”

Proof, or the lack of it: a big theme in *Gasland* that continues to play out. Andrew Kirchner, the law student studying waste disposal in Pennsylvania, recalls seeing puddles of tainted water outside a house located downhill from a well pad. Residents claimed their drinking water contained heavy metals. “It makes sense that elevated

arsenic levels in people's well water would come from the fracking, but can you prove it? And a lot of these people can't," Kirchner says. "Getting your well tested can cost thousands of dollars. No one tests until there's a problem. The gas company can then say, 'Do you know what your water contained before?'"

But it's not just a lack of funds — or even nondisclosure agreements from settled lawsuits — that keeps people quiet. Kirchner reports that some residents believe their phones are being tapped, their e-mails intercepted. "The activists there are concerned for their well-being," Kirchner says. He isn't talking about bad water or earthquakes. Paranoia strikes deep in the gaslands.

But that's Pennsylvania. We're in California now.

Summer and Smoke

It's been a long day for Fox up in the sooty air of Baldwin Hills, but he's still full of energy as he walks onto the stage in the auditorium of UCLA's Hammer Museum in Westwood. Hundreds of people have filled the seats to hear Fox and Bill McKibben, the Vermont-based author, environmentalist, and educator, give a talk called "Fracking and Keystone: Energy Independence Versus the Environment," about the proposed Keystone XL Pipeline that would pipe tar-sands oil from Alberta, Canada, to the Gulf of Mexico.

After the talk, Fox plays a traditional Scottish tune on his banjo. Then he and McKibben go into the glass-enclosed lobby to sign DVDs and books, and to chat with the audience and pose for pictures. As the crowd mingles, there is a commotion near the door. Someone shouts for Fox: it's a man in a suit, blond-haired, red-faced, his angry words garbled by the intensity of his feeling. A security guard confronts the man, who shouts and stabs his finger at the air, accusing Fox of misleading the public.

The guard gets the man out the door, and seconds later he is gone.

"Did you see that?" Fox says, to no one in particular. It's a rhetorical question, another way of saying, *They're out there*. Then someone, a fan, comes up to Fox and thanks him for *Gasland*, tells him how important it is, how brave. Fox thanks her. Then she asks if her friend can take their picture.

“Sure,” Fox says, and he turns, smiling, to the camera.

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