A REPORTER AT LARGE

NATURE'S SPOILS

The underground food movement ferments revolution.

BY BURKHARD BILGER

The house at 40 Congress Street wouldn't have been my first choice for lunch. It sat on a weedy lot in a dishevelled section of Asheville, North Carolina. Abandoned by its previous owners, condemned by the city, and minimally rehabilitated, it was occupied—perhaps infested is a better word—by a loose affiliation of opportunivores. The walls and ceilings, chicken coop and solar oven were held together with scrap lumber and drywall. The sinks, disconnected from the sewer, spilled their effluent into plastic buckets, providing water for root crops in the gardens. The whole compound was painted a sickly greenish gray—the unhappy marriage of twenty-three cans of surplus paint from Home Depot. "We didn't put in the pinks," Clover told me.

Clover's pseudonym both signalled his emancipation from a wasteful society and offered a thin buffer against its authorities. "It came out of the security culture of the old Earth First! days," another opportunivore told me. "If the Man comes around, you can't give him any incriminating information." Mostly, though, the names fit the faces: Clover was pale, slender, and sweet-natured, with fine blond hair gathered in a bun. His neighbor Catfish had droopy whiskers and fleshy cheeks. There were four men and three women in all, aged twenty to thirty-five, crammed into seven small bedrooms. Only one had a full-time job, and more than half received food stamps. They relied mostly on secondhand bicycles for transportation, and each paid two hundred dollars or less in rent. "We're just living way simple," Clover said. "Super low-impact, deep green."

Along one wall of the kitchen, rows of pine and wire shelves were crowded with dumpster discoveries, most of them pristine: boxes of organic tea and artisanal pasta, garlic from Food Lion, baby spring mix from Earth Fare, tomatoes from the farmers' market. About half the household's food had been left somewhere to rot, Clover said, and there was often enough to share with Asheville's other opportunivores. (A couple of months earlier, they'd unearthed a few dozen cartons of organic ice cream; before that, enough Odwalla juices to fill the bathtub.) Leftovers were pickled or composted, brewed into mead or, if they looked too dicey, fed to the chickens. "We have our standards," a young punk with a buzz-cut scalp and a skinny ponytail told me. "We won't dumpster McDonald's." But he had eaten a good deal of scavenged sushi, he said—it was all right, as long as it didn't sit in the dumpster overnight—and his housemate had once scored a haggis. "Oh no, no," she said, when I asked if she'd eaten it. "It was canned."

Lunch that day was lentil soup, a bowl of which was slowly congealing on the table in front of me. The carrots and onions in it had come from a dumpster behind Amazing Savings, as had the lentils, potatoes, and most of the spices. Their color reminded me a little of the paint on the house. Next to me, Sandor Katz scooped a spoonful into his mouth and declared it excellent. A self-avowed "fermentation fetishist," Katz travels around the country giving lectures and demonstrations, spreading the gospel of sauerkraut, dill pickles, and all foods transformed and ennobled by bacteria. His two books—"Wild Fermentation" and "The Revolution Will Not Be Microwaved"—have become manifestos and how-to manuals for a generation of underground food activists, and he's at work on a third, definitive volume. Lunch with the opportunivores was his idea.

Katz and I were on our way to the Green Path, a gathering of herbalists, foragers, raw-milk drinkers, and road-kill eaters in the foothills of the Smoky Mountains. The groups in Katz's network have no single agenda or ideology. Some identify themselves as punks, others as hippies, others as evangelical Christians; some live as rustically as homesteaders—the "techno-peasantry," they call themselves; others are thoroughly plugged in. If they have a connecting thread, it's their distrust of "dead, anonymous, industrialized, genetically engineered, and chemicalized corporate food," as Katz has written. Americans are killing themselves with cleanliness, he believes. Every year, we waste forty per cent of the food we produce, and process, pasteurize, or irradiate much of the rest, sterilizing the live cultures that keep us healthy. Lunch from a dumpster isn't just a form of conservation; it's a kind of inoculation.

"This is a modern version of the ancient tradition of gleaning," Katz said. "When the harvest is over, the community has a common-law right to pick over what's left." I poked at the soup with my spoon. The carrots seemed a little soft—whether overcooked or overripe, I couldn't tell—but they tasted all right. I asked the kid with the ponytail if he'd ever brought home food that was spoiled. "Oh, hell yes!" he said, choking back a laugh. "Jesus Christ, yes!" Then he shrugged, suddenly serious. "It happens: diarrhea, food poisoning. But I think we've developed pretty good immune systems by now."

To most cooks, a kitchen is a kind of battle zone—a stainless-steel arena devoted to the systematic destruction of bacteria. We fry them in oil and roast them in ovens, steam them, boil them, and sluice them with detergents. Our bodies are delicate things, easily infected, our mothers taught us, and the agents of microscopic villainy are everywhere. They lurk in raw meat, raw vegetables, and the yolks of raw eggs, on the unwashed hand and in the unmuffled sneeze, on the grimy countertop and in the undercooked pork chop.

Or maybe not. Modern hygiene has

Sauerkraut is Sandor Katz's gateway drug. Simple and safe to make, it leads novice picklers to more offbeat practices.

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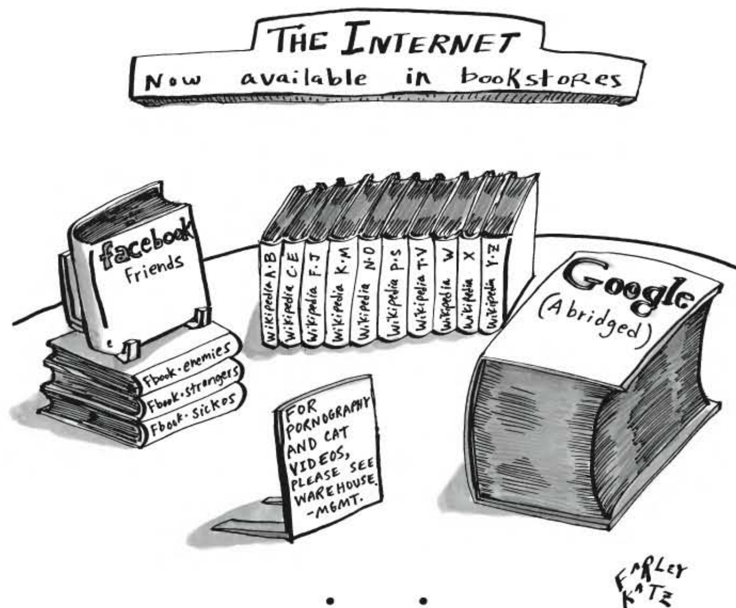


prevented countless colds, fevers, and other ailments, but its central premise is hopelessly outdated. The human body isn't besieged; it's saturated, infused with microbial life at every level. "There is no such thing as an individual," Lynn Margulis, a biologist at the University of Massachusetts at Amherst, told me recently. "What we see as animals are partly just integrated sets of bacteria." Nearly all the DNA in our bodies belongs to microorganisms: they outnumber our own cells nine to one. They process the nutrients in our guts, produce the chemicals that trigger sleep, ferment the sweat on our skin and the glucose in our muscles. ("Humans didn't invent fermentation," Katz likes to say. "Fermentation created us.") They work with the immune system to mediate chemical reactions and drive out the most common infections. Even our own cells are kept alive by mitochondria—the tiny microbial engines in their cytoplasm. Bacteria are us.

"Microbes are the minimal units, the basic building blocks of life on earth," Margulis said. About half a billion years ago, land vertebrates began to encase themselves in skin and their embryos in protective membranes, sealing off the microbes inside them and fostering ever more intimate relations with them. Humans are the acme of that evolution—walking, talking microbial vats. By now, the communities we host are so varied and interdependent that it's hard to tell friend from enemy—the bacteria we can't live with from those we can't live without. *E. coli*, *Staphylococcus aureus*, and the bacteria responsible for meningitis and stomach ulcers all live peaceably inside us most of the time, turning dangerous only on rare occasions and for reasons that are poorly understood. "This cliché nonsense about good and bad bacteria, it's so insidious," Margulis said. "It's this Western, dichotomized, Cartesian thing. . . . Like Jesus rising."

In the past decade, biologists have embarked on what they call the second human-genome project, aimed at identifying every bacterium associated with people. More than a thousand species have been found so far in our skin, stomach, mouth, guts, and other body parts. Of those, only fifty or so are known to harm us, and they have been studied obsessively for more than a century. The rest are mostly new to science. "At this juncture, biologists cannot be blamed for finding themselves in a kind of 'future shock,'" Margaret McFall-Ngai, an expert in symbiosis at the University of Wisconsin at Madison, wrote in *Nature Reviews Microbiology* two years ago. Or, as she put it in an earlier essay, "We have been looking at bacteria through the wrong end of the telescope."

Given how little we know about our inner ecology, carpet-bombing it might not always be the best idea. "I would put it very bluntly," Margulis told me. "When you advocate your soaps that say they kill all harmful bacteria, you are committing suicide." The bacteria in the gut can take up to four years to recover from a round of antibiotics, recent studies have found, and the steady assault of detergents, preservatives, chlorine, and other chemicals also takes its toll. The immune system builds up fewer antibodies in a sterile environment; the deadliest pathogens can grow more resistant to antibiotics; and innocent bystanders such as peanuts or gluten are more likely to provoke allergic reactions. All of which may explain why a number of studies have found that children raised on farms are less susceptible to allergies, asthma, and autoimmune diseases. The cleaner we are, it sometimes seems, the sicker we get.

"We are living in this cultural project that's rarely talked about," Katz says. "We hear about the war on terror. We hear about the war on drugs. But the war on bacteria is much older, and we've all been indoctrinated into it. We have to let go of the idea that they're our enemies." Eating bacteria is one of life's great pleasures, Katz says. Beer, wine, cheese, bread, cured meats, coffee, chocolate: our best-loved foods are almost all fermented. They start out bitter, bland, cloying, or indigestible and are remade by microbes into something magnificent.

Fermentation is a biochemical magic trick—a benign form of rot. It's best known as the process by which yeast turns sugar into alcohol, but an array of other microorganisms and foods can ferment as well. In some fish dishes, for instance, the resident bacteria digest amino acids and spit out ammonia, which acts as a preservative. Strictly speaking, all fermentation is anaerobic (it doesn't consume oxygen); most rot is aerobic. But the two are separated less by process than by product. One makes food healthy and delicious; the other not so much.

Making peace with microorganisms has its risks, of course. *E. coli* can kill you. Listeria can kill you. Basic hygiene and antibiotic overkill aren't hard to tell apart at home, but the margin of error shrinks dramatically in a factory. Less than a

gram of the bacterial toxin that causes botulism, released into the American milk supply, could poison a hundred thousand people, the National Academy of Sciences estimated in 2005. And recent deaths and illnesses from contaminated beef, spinach, and eggs have persuaded food regulators to clamp down even harder. While Katz's followers embrace their bacterial selves, the Obama Administration has urged Congress to pass a comprehensive new set of food-safety laws, setting the stage for a culture war of an unusually literal sort. "This is a revolution of the everyday," Katz says, "and it's already happening."

When Katz picked me up in Knoxville at the beginning of our road trip, the back seat of his rented Kia was stacked with swing-top bottles and oversized Mason jars. They were filled with foamy, semi-opaque fluids and shredded vegetables that had been fermenting in his kitchen for weeks. A sour, pleasantly funky aroma pervaded the cabin, masking the new-car smell of industrial cleaners and off-gassing plastics. It was like driving around in a pickle barrel.

Physically speaking, food activists tend to present a self-negating argument. The more they insist on healthy eating the unhealthier they look. The pickier they are about food the more they look like they could use a double cheeseburger. Katz was an exception. At forty-eight, he had clear blue eyes, a tightly wound frame, and ropy forearms. His hands were calloused and his skin was ruddy from hours spent weeding his commune's vegetable patches and herding its goats. He wore his hair in a stubby Mohawk, his beard in bushy muttonchops. If not for his multiple earrings and up-to-the-minute scientific arguments, he might have seemed like a figure out of the nineteenth century, selling tonics and bromides from a painted wagon.

Katz was a political activist long before he was a fermentation fetishist. Growing up on New York's Upper West Side, the eldest son of progressive Polish and Lithuanian Jews, he was always involved in one campaign or another. At the age of ten, in 1972, he spent his afternoons on street corners handing out buttons for George McGovern. At eleven, he was a campaign volunteer for the mayoral candidate Al Blumenthal. When he reached sixth grade and found that one of the city's premier programs for gifted students, Hunter College High School, was only for girls, he helped bring an anti-discrimination suit that forced it to turn coed. He later served on the student council with Elena Kagan, the future Supreme Court Justice. "The staggered lunch hour was our big issue," he says.

At Brown, as an undergraduate, Katz became a well-known figure: a bearish hippie in the Abbie Hoffman mold, with a huge head of curly hair. His causes were standard issue for the time: gay rights, divestment from South Africa, U.S. out of Central America (as a senior, he and a group of fellow-activists placed a C.I.A. recruiter under citizen's arrest). Yet Katz lacked the usual stridency of the campus radical. "I remember a particular conversation in 1982 or '83," his classmate Alicia Svigals, who went on to found the band the Klezmatics, told me. "We were standing on a street corner in Providence, and I said, 'Sandy, I think I might be a lesbian.' And he said, 'Oh, I think I might be gay.' At the time, that was a huge piece of news. It wasn't something you said lightly. But his reaction was 'How wonderful and exciting! How fantastic! This is going to be so much fun!' The world was about to be made new—and so easily."

After graduation, Katz moved back to New York. He took a job as the executive director of Westpride, a lobbying group opposed to a massive development project on the Upper West Side. (The developer, Donald Trump, was eventually forced to scale down his plans.) As the AIDS epidemic escalated, in the late eighties, Katz became an organizer for ACT UP and a columnist for the magazine *OutWeek*. His efforts on both fronts caught the eye of Ruth Messinger, the Manhattan borough president, who hired him in 1989 as a land-use planner and as a de-facto liaison to the gay community. "He was a spectacular person," Messinger told me recently. "Creative and flamboyant and fun to be around. He just had a natural instinct and talent as an organizer of people." Messinger was thinking of running for mayor (she won the Democratic nomination in 1997, only to get trounced by Rudolph Giuliani), and Katz's ambitions rose with hers. "I would fantasize about what city agency I wanted to administer," he recalls. Then, in 1991, he found out he was H.I.V.-positive.

Katz had never been particularly promiscuous. He'd had his first gay sexual experience at the age of twenty-one, crossing the country on a Green Tortoise bus, and had returned to New York just as its bathhouse days were waning. He'd never taken intravenous drugs and had avoided the riskiest sexual activities. The previous H.I.V. tests he'd taken had come back inconclusive—perhaps, he reasoned, because of a malarial infection that he'd picked up in West Africa. "I have no idea how it happened," he told me. "I remember walking out of the doctor's office in such a daze. I was just utterly shell-shocked."

The virus wasn't necessarily a death sentence, though an effective treatment was years away. But it did transform Katz's political ambitions. "They just dematerialized," he told me. For all his iconoclasm, he had always dreamed of being a United States senator. Now he focussed on curing himself. He cut back his hours and moved from his parents' apartment to the East Village. So many of his friends had died while on AZT and other experimental drugs that he decided to search for alternatives. He had already taken up yoga and switched to a macrobiotic diet. Now he began to consult with herbalists, drink nettle tea, and wander around Central Park gathering medicinal plants. "I got skinny, skinny, skinny," he says. "My friends thought I was wasting away."

New York's relentless energy had always helped drive his ambitions, but now he found that it wore him out. About a year after his diagnosis, Katz went to visit some friends in New Orleans who had rented a crash pad for Mardi Gras. Among the characters there, he met a man from a place near Nashville called Hickory Knoll (I've changed the name at Katz's request). Founded in the early seventies by a

group of back-to-the-landers, Hickory Knoll was something of a legend in the gay community: a queer sanctuary in the heart of the Bible Belt. "I was a typical New Yorker," Katz says. "I considered the idea of living in Tennessee absurd." Still, he was intrigued. Hickory Knoll had no television or hot running water—just goats, vegetable gardens, and gay men. Maybe it was just what he needed.

Hickory Knoll lies just up the road from a Bible camp, in an airy forest of tulip poplar and dogwood, maple, mountain laurel, pawpaw, and persimmon. The camp and the commune share a hilltop, a telephone cable, and, if nothing else, a belief in spiritual renewal: "Want a new life?" a sign in front of a local church asked as I drove past. "God accepts trade-ins." When Katz first arrived, in the spring of 1992, the paulownia trees were in bloom, scattering the ground with lavender petals. As he walked down the gravel path, the forest canopy opened up and a cabin of hand-hewn chestnut logs, built in the eighteen-thirties, appeared in the sunlight below. "It was a beautiful arrival," he says.

The commune had a shifting cast of about fifteen members, some of whom had lived there for decades. It billed itself as a radical faerie sanctuary, though the term was notoriously slippery—the faerie movement, begun in the late seventies by gay-rights activists, embraced everyone from transvestites to pagans and anarchists, their common interest being a focus on nature and spirituality. Street kids from San Francisco, nudists from Nashville, a Mexican minister coming out of the closet: all found their way, somehow, to central Tennessee. Most were gay men, though anyone was welcome, and the great majority had never lived on the land before. "Sissies in the wood," one writer called it, after tussling over camping arrangements with a drag queen in four-inch heels.

New arrivals stayed in the cabin "downtown," which had been fitfully expanded to encompass a library, living room, dining room, and kitchen, with four bedrooms upstairs. Farther down the path were a swaybacked red barn, a communal shower, a pair of enormous onion-domed cisterns, and a four-seater outhouse. The charge for room and board was on a sliding scale starting at seventy-five dollars a month, with a tacit agreement, laxly enforced, to pitch in—milking goats, mending fences, or just greeting new arrivals. Those who stayed eventually built houses along the ridges or bought adjacent land and started homesteads and communes of their own. In the spring, at the annual May Day celebration, their numbers grew to several hundred. "The gayborhood just keeps on growing," Weeder, Hickory Knoll's oldest member, told me one evening as we were sitting on the front porch of the cabin. "We're a pretty good voting bloc."

Inside, half a dozen men were preparing dinner. Food is the great marker of the day at Hickory Knoll—the singular goal toward which most labor and creativity tend. On my visit, the kitchen seemed to be staffed by at least three cooks at all times, cutting biscuits, baking vegan meat loaf, washing kale; one of them, a gangly Oklahoman named Lady Now, worked in the nude. "Real estate determines culture," Katz likes to say, and the maxim is doubly true among underground food movements. Urban squatters gravitate toward freeganism and dumpster diving, homesteaders toward raw milk and roadkill. At Hickory Knoll, the slow pace, lush gardens, and communal isolation are natural incubators for fermented food, though Katz didn't realize it right away. "It took a while for the New York City to wear off," Weeder told me. "Overanalyzing everything. Where am I going to go tonight? There really is nowhere to go."

That first year, a visitor named Crazy Owl brought some miso as barter for his stay, inspiring Katz to make some of his own. Miso, like many Asian staples, is usually made of fermented soybeans. The beans are hard to stomach alone, no matter how long they're cooked. But once inoculated with koji—the spores of the *Aspergillus oryzae* mold—they become silken and delicious. The enzymes in the mold predigest the beans, turning starches into sugars, breaking proteins into amino acids, unlocking nutrients from leaden compounds. A lowly bean becomes one of the world's great foods.

Katz experimented with more and more fermented dishes after that. He made tempeh, natto, kombucha, and kefir. He recruited friends to chew corn for chicha—an Andean beer brewed with the enzymes in human saliva. At the Vanderbilt library, in Nashville, he worked his way through the "Handbook of Indigenous Fermented Foods" (1983), by the Cornell microbiologist Keith Steinkraus. When he'd gathered a few dozen recipes, he printed a pamphlet and sold some copies to a bookstore in Maine and a permaculture magazine in North Carolina. The pamphlet led to a contract from a publisher, Chelsea Green, and the release of "Wild Fermentation," in 2003. The book was only a modest success at first, but sold more copies each year—some seventy thousand in all. Soon Katz was crisscrossing the country in his car, shredding cabbage in the aisles of Whole Foods or Trader Joe's, preaching the glories of sauerkraut.

"Fermented foods aren't culinary novelties," he told me one morning. "They aren't cupcakes. They're a major survival food." We were standing in his test kitchen, in the basement of a farmhouse a few miles down the road from Hickory Knoll. Katz had rented the space two years earlier, when his classes and cooking projects outgrew the commune's kitchen, and outfitted it with secondhand equipment: a triple sink, a six-burner stove, a freezer, and two refrigerators, one of them retrofitted as a tempeh incubator. Along one wall, a friend had painted a psychedelic mural showing a man conversing with a bacterium. Along another, Katz had pinned a canticle to wild fermentation, written by a Benedictine nun in New York. A haunch of venison hung in back, curing for prosciutto, surrounded by mismatched jars of sourdough, goat kefir, sweet potato fly, and other ferments, all bubbling and straining at their lids. "It's like having pets," Katz said.

The kitchen had the same aroma as Katz's car, only a few orders of magnitude funkier: the smell of life before cold storage. "We are living in the historical bubble of refrigeration," Katz said, pulling a jar of bright-pink-and-orange sauerkraut off the shelf. "Most of these food movements aren't revolutionary so much as conservative. They want to bring back the way food has been."

Fermentation, like cooking with fire, is one of the initial conditions of civilization. The alcohol and acids it produces

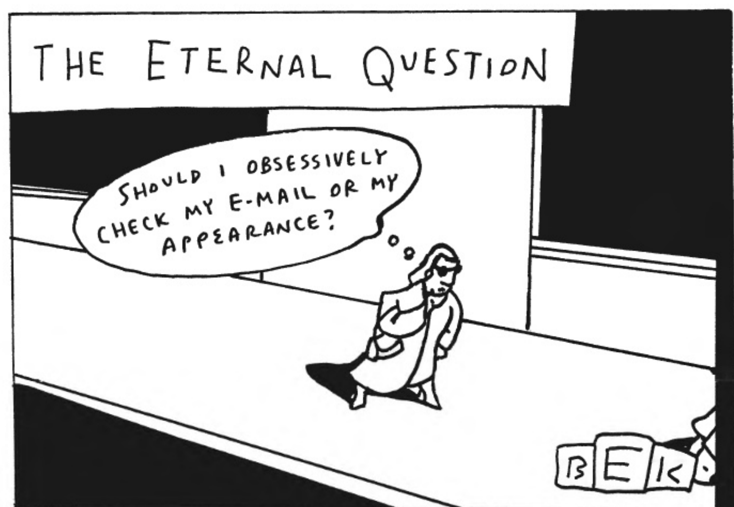
can preserve fruits and grains for months and even years, making sedentary society possible. The first ferments happened by accident—honey water turned to mead, grapes to vinegar—but people soon learned to re-create them. By 5400 B.C., the ancient Iranians were making wine. By 1800 B.C., the Sumerians were worshipping Ninkasi, the goddess of beer. By the first century B.C., the Chinese were making a precursor to soy sauce.

Katz calls fermentation the path of least resistance. "It's what happens when you do nothing," he says. Or, rather, if you do one or two simple things. A head of cabbage left on a counter will never turn to sauerkraut, no matter how long it sits there. Yeasts, molds, and a host of bacteria will attack it, digesting the leaves till all that's left is a puddle of black slime. To ferment, most food has to be protected from the air. It can be sealed in a barrel, stuffed in a casing, soaked in brine, or submerged in its own juices—anything, as long as oxygen doesn't touch it. The sauerkraut Katz was holding had been made ten days earlier. I'd watched him shred the cabbage—one head of red and one of green—sprinkle it with two tablespoons of salt to draw out the water, and throw in a few grated carrots. He'd scrunched everything together with his hands, to help release the juice, and packed it in a jar until the liquid rose to the top. "I would suggest not sealing it too tightly," he said, as he clamped down the lid. "Some jars will explode."

Three waves of bacteria had colonized the kraut since then, each one changing the chemical environment just enough to attract and fall victim to the next—like yuppie remodellers priced out of their own neighborhood. Sugars had been converted to acids, carbon dioxide, and alcohol. Some new nutrients had been created: B vitamins, for instance, and isothiocyanates, which laboratory studies have found to inhibit lung, liver, breast, and other cancers. Other nutrients were preserved, notably Vitamin C. When Captain Cook circled the globe between 1772 and 1775, he took along thirty thousand pounds of sauerkraut, and none of his crew died of scurvy.

I tried a forkful from Katz's jar, along with a slab of his black-rice tempeh. The kraut was crunchy and tart—milder than any I'd had from a store and much fresher tasting. "You could eat it after two weeks, you could eat it after two months, and if you lived in a cold environment and had a root cellar you could eat it after two years," Katz said. The longer it fermented the stronger it would get. His six-month-old kraut, made with radishes and Asian greens, was meaty, pungent, and as tender as pasta—the enzymes in it had broken down the pectin in its cell walls. Some people like it that way, he said. "When this Austrian woman tasted my six-week-old sauerkraut, she said, 'That's O.K.—for coleslaw.'"

While we were eating, the front door banged open and a young man walked in carrying some baskets of fresh-picked strawberries. He had long blond hair and hands stained red with juice. His name was Jimmy, he said. He lived at Hickory Knoll but was doing some farming up the road. "We originally grew herbs and flowers and planted them in patterns," he said. "But people were like, 'What are those patterns you're makin'? They don't look Christian to me.'" The locals were usually pretty tolerant, Katz said. In eighteen years, the worst incidents that he could recall were a few slashed tires and some teen-agers yelling "Faggots!" from the road and shooting shotguns in the air. Rural Tennessee is a "don't ask, don't tell" sort of place, where privacy is the one inalienable right. But Jimmy's fancy crop might have counted as a public display. He laughed and handed me a berry, still warm from the sun. "They're not only organic," he said. "They're grown with gay love."



The fruit was sugar-sweet and extravagantly fragrant—a distillation of spring. But the sauerkraut was the more trustworthy food. An unwashed fruit or vegetable may host as many as a million bacteria per gram, Fred Breidt, a microbiologist with the United States Department of Agriculture and a professor of food science at North Carolina State University, told me. "We've all seen the cases," Katz said. "The runoff from agriculture gets onto a vegetable, or there's fecal matter from someone who handled it. Healthy people will get diarrhea; an elderly person or a baby might get killed. That's a possibility with raw food." If the same produce were fermented, its native bacteria would drive off the pathogens, and the acids and alcohol they produce would prevent any further infection. Breidt has yet to find a single documented case of someone getting sick from contaminated sauerkraut. "It's the safest food there is," Katz said.

Sauerkraut is Katz's gateway drug. He lures in novices with its simplicity and safety, then encourages them to experiment with livelier cultures, more offbeat practices. "The Revolution Will Not Be Microwaved" moves from anodyne topics such as seed saving and urban gardening to dirt eating, feral foraging, cannabis cookery, and the raw-milk underground. Unlike many food activists, Katz has a clear respect for peer-reviewed science and he prefaces

each discussion with the appropriate caveats. Yet his message is clear: "Our food system desperately demands subversion," he writes. "The more we sterilize our food to eliminate all theoretical risk, the more we diminish its nutritional quality."

On the first day of our road trip, not long after our lunch with the opportunivores, Katz and I paid a visit to a man he called one of the kingpins of underground food in North Carolina. Garth, as I'll call him, was a pale, reedy figure in his fifties with wide, spectral eyes. His linen shirt and suspenders hung slackly on his frame, and his sunken cheeks gave him the look of a hardscrabble farmer from a century ago. "I was sick for seventeen years," he told us. "Black circles under my eyes, weighed less than a hundred pounds. It didn't seem like I'd get very far." Doctors said that he had severe chemical sensitivities and a host of ailments—osteoporosis, emphysema, edema, poor circulation—but they seemed incapable of curing him. He tried veganism for a while, but only got weaker. "It's just not a good diet for skinny people," he said. So he went to the opposite extreme.

Inside his bright country kitchen, Garth carefully poured us each a glass of unpasteurized goat milk, as if proffering a magic elixir. The milk was pure white and thick as cream. It had a long, flowery bloom and a faint tanginess. Raw milk doesn't spoil like pasteurized milk. Its native bacteria, left to multiply at room temperature, sour it into something like yogurt or buttermilk, only much richer in cultures. It was the mainstay of Garth's diet, along with raw butter, cream, and daily portions of raw liver, fish, chicken, or beef. He was still anything but robust, but he had enough energy to work long hours in the garden for the first time in years. "It enabled me to function," he said.

Raw milk brings the bacterial debate down to brass tacks. Drinking it could be good for you. Then again it could kill you. Just where the line between risk and benefit lies is a matter of fierce dispute—not to mention arrests, lawsuits, property seizures, and protest marches. In May, for instance, raw-milk activists, hoping to draw attention to a recent crackdown by Massachusetts agricultural authorities, milked a Jersey cow on Boston Common and staged a drink-in.

Retail sales of raw milk are illegal in most states, including North Carolina, but people drink it anyway. Some dairy owners label the milk for pet consumption only (though at two to five times the cost of pasteurized, it's too rich for most cats). Others sell it at farm stands or through herd-share programs. In my neighborhood in Brooklyn, the raw-milk coöperative meets every month in the aisles of a gourmet deli. The milk is trucked in from Pennsylvania—a violation of federal law, which prohibits the interstate transport of raw milk—but no one seems to mind. Garth buys milk from a local farmer and sells it out of his house. "It's illegal," he told me. "But it gets to the point where living is illegal."

The nutritional evidence both for and against raw milk is somewhat sketchy; much of it dates from before the Second World War, when raw milk was still legal. The Food and Drug Administration, in a fact sheet titled "The Dangers of Raw Milk," insists that pasteurization "DOES NOT reduce milk's nutritional value." The temperature of the process, well below the boiling point, is meant to kill pathogens and leave nutrients intact. Yet raw-milk advocacy groups, such as the Weston A. Price Foundation, in Washington, D.C., point to a number of studies that suggest the opposite. An array of vitamins, enzymes, and other nutrients are destroyed, diminished, or denatured by heat, they say. Lactase, for instance, is an enzyme that breaks down lactose into simpler sugars that the body can better digest. Raw milk often contains *lactobacilli* and *bifidobacteria* that produce lactase, but neither the bacteria nor the enzyme can survive pasteurization. In one survey of raw-milk drinkers in Michigan and Illinois, eighty-two per cent of those who had been diagnosed as lactose intolerant could drink raw milk without digestive problems. (A more extreme view, held by yet another dietary faction, is that people shouldn't be drinking milk at all—that it's a food specifically designed for newborns of other species, and as such inimical to humans.)

To the F.D.A., the real problem with milk isn't indigestion but contamination. Poor hygiene and industrial production are a toxic combination. One sick cow, one slovenly worker can contaminate the milk of a dozen dairies. In 1938, a quarter of all disease outbreaks from contaminated food came from milk, which had been known to carry typhoid, tuberculosis, diphtheria, and a host of other diseases. More recently, between 1998 and 2008, raw milk was responsible for eighty-five disease outbreaks in more than twenty states, including more than sixteen hundred illnesses, nearly two hundred hospitalizations, and two deaths. "Raw milk is inherently dangerous," the F.D.A. concludes. "It should not be consumed by anyone at any time for any purpose."

Thanks in large part to pasteurization, dairy products now account for less than five per cent of the foodborne disease outbreaks in America every year. Smoked seafood is six times more likely than pasteurized milk to contain listeria; hot dogs are sixty-five times more likely, and deli meats seventy-seven times more likely. "Every now and then, I meet people in the raw-milk movement who say, 'We have to end pasteurization now!'" Katz told me. "We can't end pasteurization. It would be the biggest disaster in the world. There would be a lot of dead children around."

Still, he says, eating food will always entail a modicum of risk. In an average year, there are seventy-six million cases of food poisoning in America, according to the Centers for Disease Control. Raw milk may be more susceptible to contamination than most foods (though it's still ten times less likely to contain listeria than deli meat is). But just because it can't be produced industrially doesn't mean it can't be produced safely, in smaller quantities. Wisconsin has some thirteen thousand dairies, about half of which, local experts estimate, are owned by farmers who drink their own raw milk. Yet relatively few people have been known to get sick from it. "If this were such a terrible cause and effect, we would be in the newspaper constantly," Scott Rankin, the chairman of the food-science department at the University of Wisconsin at Madison, and a member of the state's raw-milk working group,

told me. "Clearly there is an argument to be made in the realm of, yeah, this is a tiny risk."

The country's largest raw-milk dairy is Organic Pastures, in Fresno, California. Its products are sold in three hundred and seventy-five stores and serve fifty thousand people a week. "Nobody's dying," the founder and C.E.O., Mark McAfee, told me. In ten years, only two of McAfee's customers have reported serious food poisoning, he says, and none of the bacteria in those cases could be traced to his dairy. Raw milk is rigorously tested in California and has to meet strict limits for bacterial count. The state's standards hark back to the early days of pasteurization, when many doctors considered raw milk far more nutritious than pasteurized, and separate regulations insured its cleanliness. Dealing with live cultures, Katz and McAfee argue, forces dairies to do what all of agriculture should be doing anyway: downsize, localize, clean up production. "We need to go back a hundred and fifty years," McAfee told me. "Going back is what's going to help us go forward."

A century and a half is an eternity in public-health terms, but to followers of the so-called primal diet it's not nearly long enough. Humans have grown suicidally dainty, many of them say, and even a diet enriched by fermented foods and raw milk is too cultivated by half. Our ancestors were rough beasts: hunters, gatherers, scavengers, and carrion eaters, built to digest any rude meal they could find. Fruits and vegetables were a rarity, grains nonexistent. The human gut was a wild kingdom in those days, continually colonized and purged by parasites, viruses, and other microorganisms picked up from raw meat and from foraging. What didn't kill us, as they say, made us stronger.

A few miles north of downtown Asheville, in a small white farmhouse surrounded by trees, two of Katz's acquaintances were doing their best to emulate early man. Steve Torma ate mostly raw meat and raw dairy. His partner, Alan Muskat, liked to supplement his diet with whatever he could find in the woods: acorns, puffballs, cicadas and carpenter ants, sumac leaves and gypsy-moth caterpillars. Muskat was an experienced mushroom hunter who had provisioned a number of restaurants in Asheville, and much of what he served us was surprisingly good. The ants, collected from his woodpile in the winter when they were too sluggish to get away, had a snappy texture and bright, tart flavor—like organic Pop Rocks. (They were full of formic acid, which gets its name from the Latin word for ant.) He brought us a little dish of toasted acorns, cups of honey-sweetened sumac tea, and goblets of a musky black broth made from decomposed inky-cap mushrooms. I felt, for a moment, as if I'd stumbled upon a child's tea party in the woods.

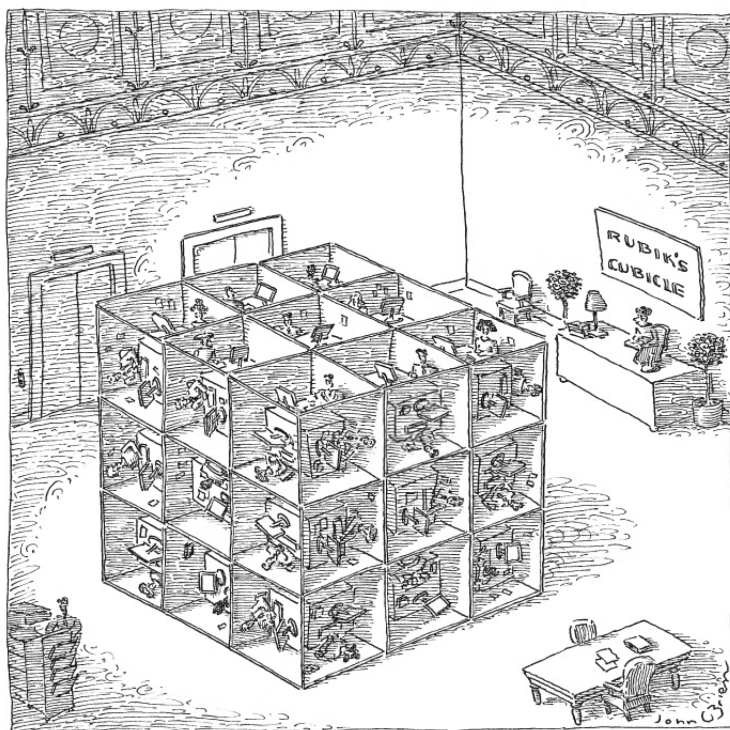
The primal diet has found a sizable following in recent years, particularly in Southern California and, for some reason, Chicago. Its founder, Aajonus Vonderplanitz, a sixty-three-year-old former soap-opera actor and self-styled nutritionist, claims that it cured him of autism, angina, dyslexia, juvenile diabetes, multiple myeloma, and stomach cancer, as well as psoriasis, bursitis, osteoporosis, tooth decay, and "mania created by excessive fruit." Vonderplanitz recommends eating roughly eighty-five per cent animal products by volume, supplemented by no more than one fruit a day and a pint or so of "green drink"—a purée of fruits and vegetable juices. (Whole vegetable fibres, he believes, are largely indigestible.) The diet's most potent component, though, is an occasional serving of what Vonderplanitz calls "high meat."

Torma ducked into the back of the house and returned with a swing-top jar in his hands. Inside lay a piece of organic beef, badly spoiled. It was afloat in an ochre-colored puddle of its own decay, the muscle and slime indistinguishable, like a slug. High meat is the flesh of any animal that has been allowed to decompose. Torma keeps his portions sealed for up to several weeks before ingesting them, airing them out every few days. (Like the bacteria in sauerkraut, those which cause botulism are anaerobic; fermentation destroys them, but they sometimes survive in sealed meats—*botulus*, in Latin, means sausage.) Vonderplanitz says that he got high meat and its name from the Eskimos, who savor rotten caribou and seal. A regular serving of decayed heart or liver can have a "tremendous Viagra effect" on the elderly, Vonderplanitz told me recently. The first few bites, though, can be rough going. "I still have some resistance to it," Torma admitted. "But the health benefits! I'm fifty-two now. I started this when I was forty-two, and I feel like I'm in my twenties."

Primal eating has its detractors: The *Times* of London recently dubbed it "the silliest diet ever." Most of us find whole vegetables perfectly digestible. The notion that parasites and viruses are good for us would be news to most doctors. And even Vonderplanitz and his followers admit that high meat sometimes leaves them ill and explosively incontinent. They call it detoxification.

Still, radical measures like these have had some surprising successes. In a case published last year in the *Journal of Clinical Gastroenterology*, a sixty-one-year-old woman was given an entirely new set of intestinal bacteria. The patient was suffering from severe diarrhea, Janet Jansson, a microbial ecologist at Lawrence Berkeley National Laboratory, told me. "She lost twenty-seven kilograms and was confined to a diaper and a wheelchair." To repopulate her colon with healthy microbes, Jansson and her collaborators arranged for a fecal transplant from the patient's husband. "They just put it in a Waring blender and turned it into a suppository," Jansson says. "It sounds disgusting, but it cured her. When we got another sample from her, two days later, she had adopted his microbial community." By then, her diarrhea had disappeared.

Other experiments have been even more dramatic. At Washington University, in St. Louis, the biologist Jeff Gordon has found that bacteria can help determine body weight. In a study published in *Nature* in 2006, Gordon and his lab-mates, led by Peter Turnbaugh, took a group of germ-free mice, raised in perfect sterility, and divided it in two. One group was inoculated with bacteria from normal mice; the other with bacteria from mice that had been bred to be obese. Both groups gained weight after the inoculation, but those with bacteria from obese mice had nearly twice the percentage of body fat by the end of the experiment. Later, the same lab took normal mice, fed them until they were fat, and transplanted their bacteria into other normal mice. Those mice grew fat,



too, and the same pattern held true when the mice were given bacteria from obese people. "It's a positive-feedback loop," Ruth Ley, a biologist from Gordon's lab who now teaches at Cornell, told me. "Whether you're genetically obese or obese from a high-fat diet, you end up with a microbial community that is particularly good at extracting calories. It could mean that an obese person can extract an extra five or ten calories out of a bowl of Cheerios."

Biologists no longer doubt the depth of our dependence on bacteria. Jansson avoids antibiotics unless they're the only option, and eats probiotic foods like yogurt and prebiotic foods like yacón, a South American root that nourishes bacteria in the gut. Until we understand more about this symbiosis, she and others say, it's best to ingest the cultures we know and trust. "What's beautiful about fermenting vegetables is that they're naturally populated by lactic-acid bacteria," Katz said. "Raw flesh is sterile. You're just culturing whatever was on the knife."

When Torma unclamped his jar, a sickly-sweet miasma filled the air—an odor as natural as it was repellent. Decaying meat produces its own peculiar scent molecules, I later learned, with names like putrescine and cadaverine. I could still smell them on my clothes hours later. Torma stuck two fingers down the jar and fished out a long, wet sliver. "Want a taste?" he said.

It was the end of a long day. I'd spent most of it consuming everything set before me: ants, acorns, raw milk, dumpster stew, and seven kinds of mead, among other delicacies. But even Katz took a pass on high meat. While Torma threw back his head and dropped in his portion, like a seal swallowing a mackerel, we quietly took our leave. "You have to trust your senses," Katz said, as we were driving away. "To me, that smelled like death."

Katz has lived with H.I.V. for almost two decades. For many years, he medicated himself with his own ferments and local herbs—chickweed, yellow dock, violet leaf, burdock root. But periodic tests at the AIDS clinic in Nashville showed that his T-cell count was still low. Then, in the late nineties, he began to lose weight. He often felt listless and mildly nauseated. At first, he assumed that he was just depressed, but the symptoms got worse. "I started feeling light-headed a lot and I had a couple of fainting episodes," he told me. "It dawned on me very slowly that I was suffering from classic AIDS wasting syndrome."

By then, an effective cocktail of AIDS drugs had been available for almost three years. Katz had seen it save the life of one of his neighbors in Tennessee. "It was a really dramatic turnaround," he told me. "But I didn't want my life to be medically managed. I had a real reluctance to get on that treadmill." In the summer of 1999, he took a road trip to Maine to visit friends, hoping to snap out of his funk. By the time he got there, he was so exhausted that he couldn't get up for days. "I remember what really freaked me out was trying to balance my checkbook," he says. "I couldn't even do simple subtraction. It was like my brain wasn't functioning anymore." He had reached the end of his alternatives.

Katz doesn't doubt that the cocktail saved his life. In pictures from that trip, his eyes are hollowed out, his neck so thin that it juts from his woollen sweater like a broomstick. He got worse before he got better, he says—"It was like I had an anvil in my stomach." But one morning, about a month after his first dose, he woke up and felt like going for a walk. A few days after that, he had a strong urge to chop wood. He now takes three anti-retroviral and protease-inhibitor drugs every day and hasn't had a major medical problem in ten years. He still doesn't have the stamina he'd like, and his forehead is often beaded with sweat, even on cool evenings around the commune's dinner table. "I wish this weren't my reality," he told me. "I don't feel great that my life is medically managed. But if that's what's keeping me alive, hallelujah."

It's this part that incenses some of his readers: Having sung the praises of sauerkraut, revealed the secrets of kombucha, and gestured toward the green pastures of raw milk, Katz has surrendered to the false promise of Western medicine. His drug dependence is a sellout, they say—an act of bad faith. "Every two months or so, I get a letter from

some well-meaning person who's decided that they have to tell me that I'm believing a lie," he told me. "That the H.I.V. is meaningless and doesn't make people sick. That if I follow this link and read the truth I will be freed from that lie and will stop having to take toxic pills and live happily ever after." Live cultures have been part of his healing, he said. They may even help prevent diseases like cancer. "But that doesn't mean that kombucha will cure your diabetes. It doesn't mean that sauerkraut cured my AIDS."

The trouble with being a diet guru, it seems, is that the more reasonable you try to be the more likely you are to offend your most fervent followers. "The Revolution Will Not Be Microwaved" includes a chapter called "Vegetarian Ethics and Humane Meat." It begins, "I love meat. The smell of it cooking can fill me with desire, and I find its juicy, rich flavor uniquely satisfying." Katz goes on to describe his dismay at commercial meat production, his respect for vegetarianism, and his halfhearted attempts to embrace it. "When I tried being vegan, I found myself dreaming about eggs," he writes. "I could find no virtue in denying my desires. I now understand that many nutrients are soluble only in fats, and animal fats can be vehicles of rich nourishment."

Needless to say, this argument didn't fly with much of his audience. Last year, the Canadian vegan punk band Propagandhi released a song called "Human(e) Meat (The Flensing of Sandor Katz)." Flensing is an archaic locution of the sort beloved by metal bands: it means to strip the blubber from a whale. "I swear I did my best to insure that his final moments were swift and free from fear," the singer yelps. "But consideration should be made for the fact that Sandor Katz was my first kill." He goes on to describe searing every hair on Katz's body, boiling his head in a stockpot, and turning it into a spreadable headcheese. "It's a horrible song," Katz told me. "When it came out, I was not amused. I had a little fear that some lost vegan youth would try to find meaning by carrying out this fantasy. But it's grown on me."

The moon was in Sagittarius on the last night of April, the stars out in their legions. Katz and I had arrived in the Smoky Mountains to join the gathering of the Green Path. About sixty people were camped on a sparsely wooded slope half an hour west of Asheville. Tents, lean-tos, and sleeping bags were scattered among the trees, below an open shed where meals were served: dandelion greens, nettle pesto, kava brownies—the usual. In a clearing nearby, an oak branch had been stripped and erected as a maypole, and a firepit dug for the night's ceremony: the ancient festival of Beltane, or Walpurgisnacht.

We'd spent the day going on plant walks, taking wildcrafting lessons, and listening to a succession of seekers and sages—Turtle, 7Song, Learning Deer. Every few hours, a cry would go up, and the tribe would gather for an adult version of what kindergartners call Circle Time: everyone holding hands and exchanging expressions of self-conscious wonder. The women wore their hair long and loose or bobbed like pixies'; their noses were pierced and their bodies wrapped in rag scarves and patterned skirts. The men, in dreadlocks and piratical buns, talked of Babylon and polyamory. The children ran heedlessly through the woods, needing no instruction in the art of absolute freedom. "Is your son homeschooled?" I asked one mother, who crisscrossed the country with her two children and a teepee and was known as the Queen of Roadkill. She laughed. "He's unschooled," she said. "He just learns as he goes."

The Green Path was part ecological retreat and part pagan revival meeting, but mostly it was a memorial for its founder, Frank Cook, who had died a year earlier. Cook was a botanist and teacher who travelled around the world collecting herbal lore, then writing and lecturing about it back in the U.S. He lived by barter and donation, refusing to be tied down by full-time work or a single residence, and was, by all accounts, an uncommonly gifted teacher. (He and Katz often taught seminars together.) As a patron saint, though, Cook had left his flock with an uneasy legacy. When he died, at forty-six, it was owing to a tapeworm infection acquired on his travels. Antibiotics might have cured him, but he mostly avoided them. By the time his mother and friends forced him to go to a hospital, last spring, his brain was riddled with tapeworm larvae and the cysts that formed around them. "Frank was pretty dogmatic about Western medicine," Katz said. "And I really think that's why he's dead."

Around the bonfire that night, I could see Katz on the other side of the circle, holding hands with his neighbors. After eighteen years in the wilderness, he couldn't imagine moving back to New York City—a weekend there could still wear him out. Yet his mind had never entirely left the Upper West Side, and his voice, clipped and skeptical, was a welcome astringent here. After a while, a woman stepped into the firelight, dressed in a long white gown with a crown of vines and spring flowers in her hair. Beltane was a time of ancient ferment, she said, when the powers of the sky come down and the powers of the earth rise up to meet them. She took two goblets and carried them to opposite points in the circle. They were full of May wine steeped with sweet woodruff, once considered an aphrodisiac. On this night, by our own acts of love and procreation, we would remind the fields and crops to grow.

There was more along those lines, though I confess that I didn't hear it. I was watching the kid to my left—a scruffy techno-peasant dressed in what looked like sackcloth and bark—take a swig of the wine. The goblets were moving clockwise around the circle, I'd noticed. By the time the other goblet reached me, thirty or forty people would have drunk from it.

I heard a throat being cleared somewhere in the crowd, and a cough quickly stifled. Embracing live cultures shouldn't mean sacrificing basic hygiene, Katz had told me that afternoon, after his sauerkraut seminar. "Part of respecting bacteria is recognizing where they can cause us problems." And so, when the kid had drunk his fill, I tapped his shoulder and asked for the goblet out of turn. I took a quick sip, sweet and bitter in equal measure. Then I watched as the wine made its way around the circle—teeming, as all things must, with an abundance of invisible life. ♦

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A conversation with Burkhard Bilger.