



The High Cost of Cheap

COAL

Coal is king again. Oil supplies are tight and natural gas prices are spiking, but coal could light our houses and power our factories for centuries. The price of this energy abundance could be high, however, as two stories on the following pages show. **The Coal Paradox** surveys the threat to global climate that legions of new coal-burning power plants would pose—a threat that new technologies could blunt. **When Mountains Move** describes a different hurt, for which there is no cure: landscapes and communities ravaged by our hunger for cheap coal.

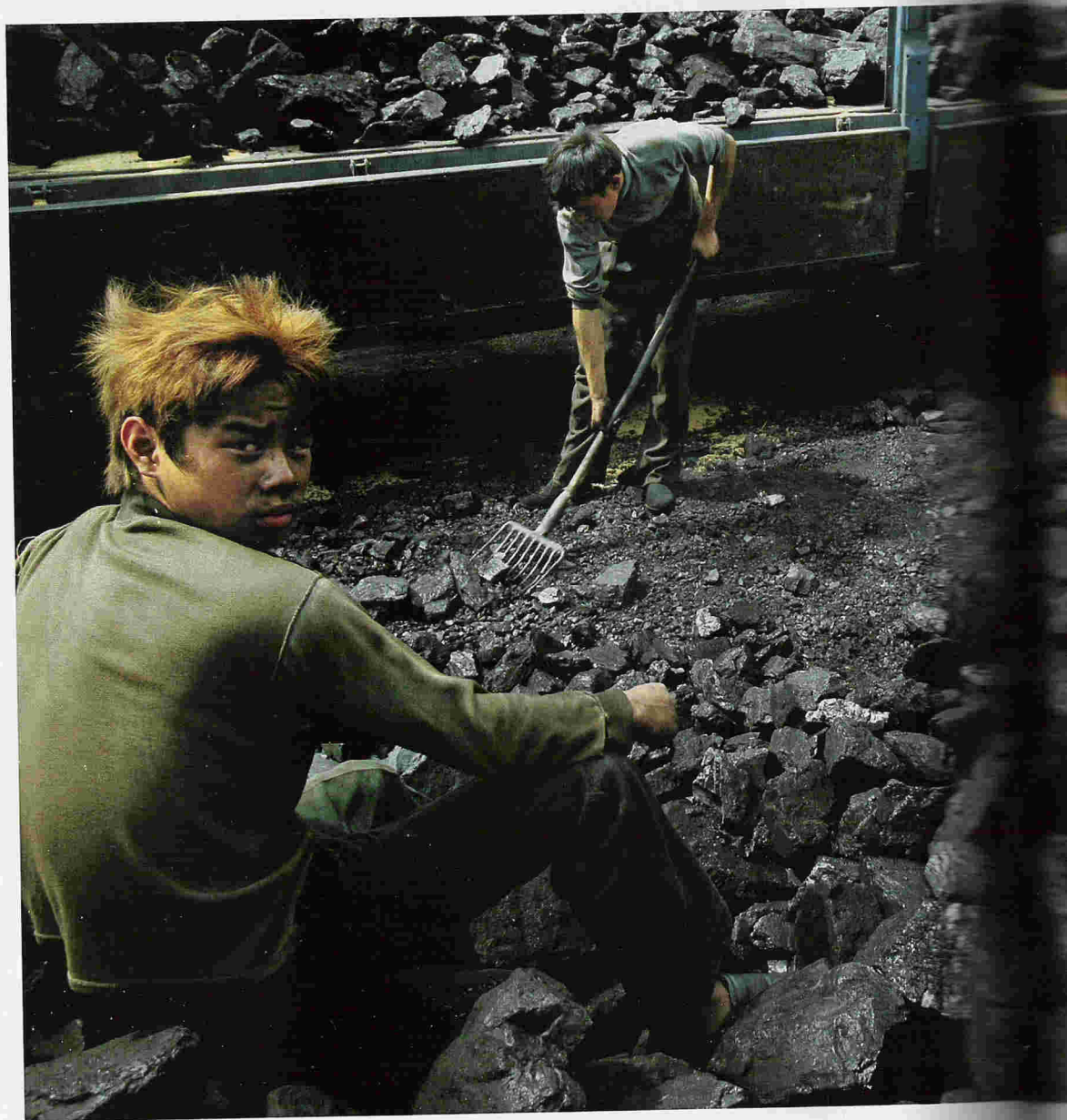
RAW POWER | Utah's Hunter plant burns 14,000 tons of coal daily, generating enough electricity for a small city. Steam wafts from 600-foot stacks along with tens of thousands of tons of climate-warming CO₂ a day.

—LESTER LEFKOWITZ, CORBIS



By Tim Appenzeller

NATIONAL GEOGRAPHIC SENIOR EDITOR



FUEL OF THE FUTURE | Workers loading coal in Shanxi Province, China, help feed the country's vast appetite for the fuel. Burned in homes, factories, and power plants, coal provides 65 percent of China's energy. Consumption—already the world's highest—could more than double in 20 years.

The Coal Paradox

We can't live without it. But can we survive with it?



PETER ESSICK, AURORA

ON A SCORCHING AUGUST DAY IN southwestern Indiana, the giant Gibson generating station is running flat out. Its five 180-foot-high boilers are gulping 25 tons of coal each minute, sending thousand-degree steam blasting through turbines that churn out more than 3,000 megawatts of electric power, 50 percent more than Hoover Dam. The plant's cooling system is struggling to keep up, and in the control room warnings chirp as the exhaust temperature rises.

But there's no backing off on a day like this, with air conditioners humming across the Midwest and electricity demand close to record levels. Gibson, one of the biggest power plants in the country, is a mainstay of the region's electricity supply, pumping enough power into the grid for three million people. Stepping from the sweltering plant into the air-conditioned offices, Angeline Protogere of Cinergy, the Cincinnati-based utility that owns Gibson, says gratefully, "This is why we're making all that power."

Next time you turn up the AC or pop in a DVD, spare a thought for places like Gibson and for the grimy fuel it devours at the rate of three 100-car trainloads a day. Coal-burning power plants like this one supply the United States with half its electricity. They also emit a stew of damaging substances, including sulfur dioxide—a major cause of acid rain—and mercury. And they gush as much climate-warming carbon dioxide as America's cars, trucks, buses, and planes combined.

Here and there, in small demonstration projects, engineers are exploring technologies that could turn coal into power without these environmental costs. Yet unless utilities start building such plants soon—and lots of them—the future is likely to hold many more traditional stations like Gibson.

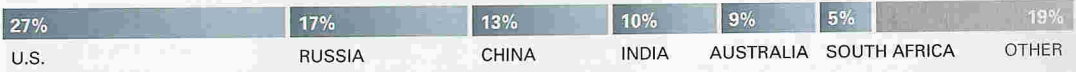
Last summer's voracious electricity use was just a preview. Americans' taste for bigger houses, along with population growth in the West and air-conditioning-dependent Southeast, will help



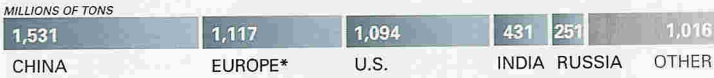
WILLIAM CAMPBELL CORP.

When you turn up the AC, think of Gibson and the grimy fuel it devours at the rate of three 100-car trainloads a day.

WHO HAS COAL? The world has more than a trillion tons of readily available coal. The U.S. has the largest share, but other energy-hungry countries, such as China and India, are richly endowed as well.



WHO USES COAL NOW? Global coal consumption is roughly five billion tons a year, with China burning the most. Western Europe has cut coal use by 36 percent since 1990 by using available natural gas from the North Sea and Russia.



WHO WILL USE IT TOMORROW? China's coal needs will more than double by 2025 to satisfy factories and consumers. The country also plans to convert coal to liquid motor fuels. Worldwide, consumption will rise by 56 percent.



*Excluding Russia

push up the U.S. appetite for power by a third over the next 20 years, according to the Department of Energy. And in the developing world, especially China, electricity needs will rise even faster as factories burgeon and hundreds of millions of people buy their first refrigerators and TVs. Much of that demand is likely to be met with coal.

For the past 15 years U.S. utilities needing to add power have mainly built plants that burn natural gas, a relatively clean fuel. But a near tripling of natural gas prices in the past seven years has idled many gas-fired plants and put a damper on new construction. Neither nuclear energy nor alternative sources such as wind and solar seem likely to meet the demand for electricity.

Meanwhile, more than a quarter trillion tons of coal lie underfoot, from the Appalachians through the Illinois Basin to the Rocky Mountains

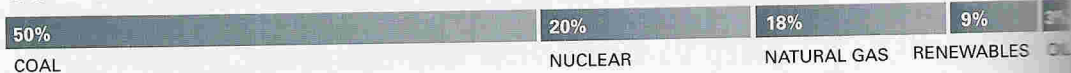
SUPPLY AND DEMAND | A coal train rumbling across Montana is a mile and a half long yet carries barely a day's fuel for a large power plant. The U.S. burns more than a billion tons of coal a year but has the world's richest deposits (above), enough to last 250 years.

—enough to last 250 years at today's consumption rate. You hear it again and again: The U.S. is the Saudi Arabia of coal. About 40 coal-burning power plants are now being designed or built in the U.S. China, also rich in coal, could build several hundred by 2025.

Mining enough coal to satisfy this growing appetite will take a toll on lands and communities (see following story, page 104). Of all fossil fuels, coal puts out the most carbon dioxide per unit of energy, so burning it poses a further threat to global climate, already warming alarmingly. With much government prodding, coal-burning utilities have cut pollutants such as sulfur dioxide and nitrogen oxides by installing equipment like the building-size scrubbers and catalytic units crowded behind the Gibson plant. But the carbon dioxide that drives global warming simply goes up the stacks—nearly two billion tons of it each year from U.S. coal plants. Within the next two decades that amount could rise by a third.

There's no easy way to capture all the carbon dioxide from a traditional coal-burning station. "Right now, if you took a plant and slapped a carbon-capture device on it, you'd lose 25 percent of the energy," says Julio Friedmann, vice

U.S. ELECTRICITY GENERATION



U.S. POWER PLANT CO₂ EMISSIONS



WHAT'S IN COAL SMOKE?

SULFUR DIOXIDE

The sulfur in coal forms this gas, which gives rise to acid rain when it reacts with water in clouds. Many plants control sulfur emissions by burning low-sulfur coal and passing the exhaust through scrubbers, which capture sulfur dioxide.

NITROGEN OXIDES

The heat of power-plant burners turns nitrogen from the air into nitrogen oxides, which can contribute to acid rain and ground-level ozone. Pollution controls on many plants limit nitrogen oxide emissions.

MERCURY

The traces of mercury in coal escape in power-plant exhaust. Falling hundreds of miles away in rain or snow, the mercury builds up in fish, making some species unsafe for children and pregnant women to eat.

CARBON DIOXIDE

Coal produces more CO₂ per energy unit than any other fossil fuel. CO₂ is a greenhouse gas, affecting climate by trapping heat that would otherwise escape to space. Power plants today release all their CO₂ into the atmosphere.

PARTICULATES

Particles from coal-burning plants can harm people who have heart and breathing disorders. Soot and ash are captured before they go up the stacks, but finer particles can form later, from oxides of sulfur and nitrogen.

studies carbon dioxide management at Lawrence Livermore National Laboratory. But a new kind of power station could change that.

A hundred miles up the Wabash River from the Gibson plant is a small power station that looks nothing like Gibson's mammoth boilers and steam turbines. This one resembles an oil refinery, all tanks and silvery tubes. Instead of burning coal, the Wabash River plant chemically transforms it in a process called coal gasification.

The Wabash plant mixes coal or petroleum coke, a coal-like residue from oil refineries, with water and pure oxygen and pumps it into a tall tank, where a fiery reaction turns the mixture into a flammable gas. Other equipment removes sulfur and other contaminants from the syngas, as it's called, before it's burned in a gas turbine to produce electricity.

Cleaning the unburned syngas is cheaper and more effective than trying to sieve pollutants from power plant exhaust, as the scrubbers at a plant like Gibson do. "This has been called the cleanest coal-fired power plant in the world," says Steven Vick, general manager of the Wabash facility. "We're pretty proud of that distinction."

The syngas can even be processed to strip out the carbon dioxide. The Wabash plant doesn't

take this step, but future plants could. Coal gasification, Vick says, "is a technology that's set up for total CO₂ removal." The carbon dioxide could be pumped deep underground into depleted oil fields, old coal seams, or fluid-filled rock, sealed away from the atmosphere. And as a bonus, taking carbon dioxide out of the syngas can leave pure hydrogen, which could fuel a new generation of nonpolluting cars as well as generate electric power.

The Wabash plant and a similar one near Tampa, Florida, were built or refurbished with government money in the mid-1990s to demonstrate that gasification is a viable electricity source. Projects in North Dakota, Canada, the North Sea, and elsewhere have tested the other parts of the equation: capturing carbon dioxide and sequestering it underground. Researchers say they need to know more about how buried carbon dioxide behaves to be sure it won't leak back out—a potential threat to climate or even people. But Friedmann says, "For a first cut, we have enough information to say, 'It's a no-brainer. We know how to do this.'"

Yet that's no guarantee utilities will embrace the gasification technology. "The fact that it's proved in Indiana and Florida doesn't mean



MITCH EPSTEIN

executives are going to make a billion-dollar bet on it,” says William Rosenberg of Harvard’s Kennedy School of Government. The two gasification power plants in the U.S. are half the size of most commercial generating stations and have proved less reliable than traditional plants. The technology also costs as much as 20 percent more. Most important, there’s little incentive for a company to take on the extra risk and expense of cleaner technology: For now U.S. utilities are free to emit as much carbon dioxide as they like.

Cinergy CEO James Rogers, the man in charge of Gibson and eight other carbon-spewing plants, says he expects that to change. “I do believe we’ll have regulation of carbon in this country,” he says, and he wants his company to be ready. “The sooner we get to work, the better. I believe it’s very important that we develop the ability to do carbon sequestration.” Rogers says he intends to build a commercial-scale gasification power plant, able to capture its carbon dioxide, and several other companies have announced similar plans.

The energy bill passed last July by the U.S. Congress offers help in the form of loan guarantees and tax credits for gasification projects. “This should jump-start things,” says Rosenberg,

A CLEANER WAY | A North Dakota chemical plant transforms coal to a gas while stripping out carbon dioxide and piping it underground to an oil field in Canada; only steam escapes. This plant sells the gas, but clean power plants of the future could make coal gas, then burn it to generate electricity.

who advocated these measures in testimony to Congress. The experience of building and running the first few plants should lower costs and improve reliability. And sooner or later, says Rogers, new environmental laws that put a price on carbon dioxide emissions will make clean technology look far more attractive. “If the cost of carbon is 30 bucks a ton, it’s amazing the kinds of technologies that will evolve to allow you to produce more electricity with less emissions.”

If he’s right, we may one day be able to cool our houses without turning up the thermostat on the entire planet. □

✦ **Insatiable Appetite** Can the Earth sustain our growing coal consumption? Is the government pushing hard enough for cleaner coal technologies? Share your thoughts in our forum at ngm.com/0603.



The High Cost of Cheap **COAL**

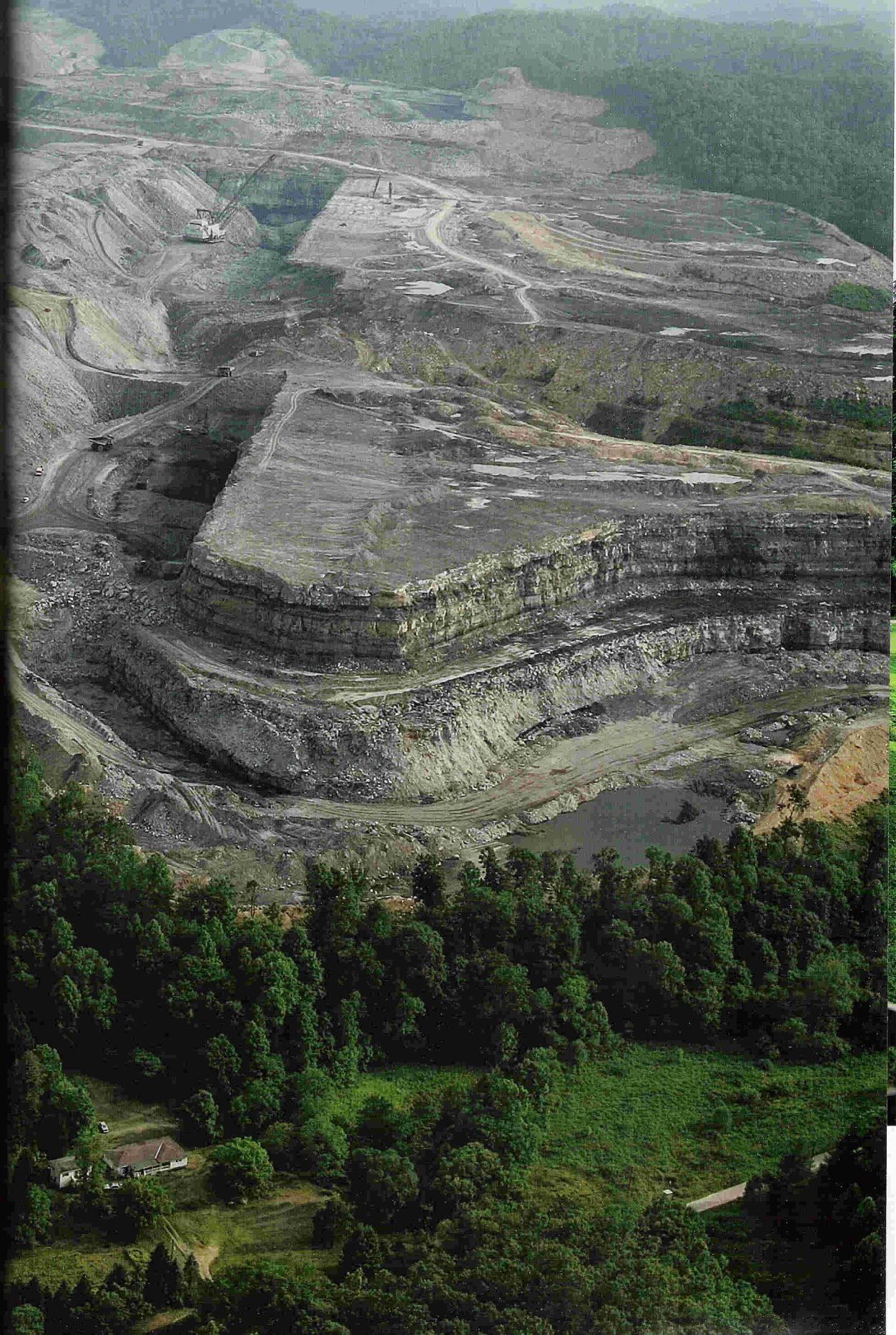
Big mining companies hit pay dirt by scalping mountaintops in the billion-dollar coalfields of southern West Virginia. But residents pay a high price in noise, air, and water pollution. From his family cemetery, Larry Gibson and his visitors look down on the mines created when a coal

When Mountains Move

company blew the top off Kayford Mountain, near Whitesville. Another company wants the 50-acre plot Gibson kinfolk have owned for two centuries. But Larry, now an environmental evangelist, vows “this land will never be for sale.”



MINE-MADE BADLANDS | One of the largest strip mines in West Virginia, Hobet 21 sprawls across almost 12,000 acres. Forests edging these mountaintop mines often block the view of them from the ground, though nearby households, right, suffer from the proximity.



By John G. Mitchell

Photographs by Melissa Farlow

COAL BROUGHT PEOPLE TO MARFORK hollow in the Appalachian Mountains of southern West Virginia. And it was coal, or rather a different way of mining it, that finally drove the people away. The last to leave was Judy Bonds.

A coal miner's daughter whose roots here go back nine generations, Bonds packed up her family and fled when she could no longer tolerate the blasting that rattled her windows, the coal soot that she suspected was clotting her grandson's lungs, and the blackwater spills that bellied-up fish in a nearby stream. Retreating to the town of Rock Creek, a few miles downstream, Bonds joined Coal River Mountain Watch, a citizens group determined to oppose surface-mining abuses.

In the years since Bonds moved, coal companies have turned to an even more aggressive mining process known as mountaintop removal. After clear-cutting a peak's forest, miners shatter its rock with high explosives. Then they scoop up the rubble in giant draglines and dump the overburden, as they call it, into a conveniently located hollow, or valley. The method was first tested in Kentucky and West Virginia in the late 1970s and has since spread to parts of Tennessee and Virginia.

"What the coal companies are doing to us and our mountains," said Bonds when she and I first met years ago, "is the best kept dirty little secret in America."

Now the secret is out. Coal companies have obliterated the summits of scores of mountains scattered throughout Appalachia, and more and more folks like Judy Bonds are decrying the environmental and social fallout of what some refer to as strip mining on steroids.

Not only is mountain topping less labor intensive than underground mining, it is also more efficient and profitable than the older form of surface mining, in which the operator stripped away the horizontal contours of a mountainside as one might peel an apple. So fast has the practice spread that there's no accurate accounting of





FAMILY TIES | It took a legal battle for the Millers and Caudills to keep the “homeplace,” inherited property now used for family gatherings. A county court granted a coal company petition to take the land to expand Hobet 21, but the state supreme court overturned that ruling. Still, Lucille Miller, far right, worries, “Eventually, we’ll be in a bowl surrounded by mining.”



“What the coal companies are doing to us and our mountains is the best kept dirty little secret in America.”

the area affected, but surface mining in general has impacted more than 400,000 acres in this four-state Appalachian region (map, page 113), including more than 1,200 miles of streambeds. If the practice continues until 2012, it will have squashed a piece of the American earth larger than the state of Rhode Island.

In the years since high-tech earthmoving machinery made mountain topping increasingly attractive to the energy industry, more and more of West Virginia's total production of coal—some 154 million tons in 2004—has come from its decapitated highlands. Relative to Western coal (Wyoming is the nation's top coal producer), second ranked West Virginia's low-sulfur bituminous burns with a cleaner, hotter efficiency in the electric power plants of America. And taxes from bituminous coal help fuel a large part of the state's economy.

But some West Virginians have been paying a hurtful price for their state's good fortune—and the coal industry's cost-cutting efficiency. In 1948 some 125,000 men worked in the mines of West Virginia. By 2005 there were fewer than 19,000, and most of these were employed in underground mines. Nowadays, it just doesn't take many hands to wrestle coal off the top of a mountain.

Consider, for example, the Big Coal River community of Sylvester, where fewer than 20 of its 195 longtime residents are employed in mining or related services. And consider Sylvester

resident Pauline Canterberry. She lives in a small house just a quarter mile down State Route 3 from a coal-washing plant operated by the Elk Run Coal Company, a subsidiary of Massey Energy, West Virginia's premier producer. Canterberry has been waging a decade-long battle with Massey and state and federal regulators over the volume of coal dust wafting from the Elk Run facility and sifting under the sills of Sylvester's homes. She has personal reasons for being concerned about the quality of the air. Her father, Ernest Spangler, died in 1957 from silicosis. His job had been putting out mine fires with buckets of pulverized rock dust. Then in 1991 her husband, John D. Canterberry, died of black lung disease after years of working in underground mines.

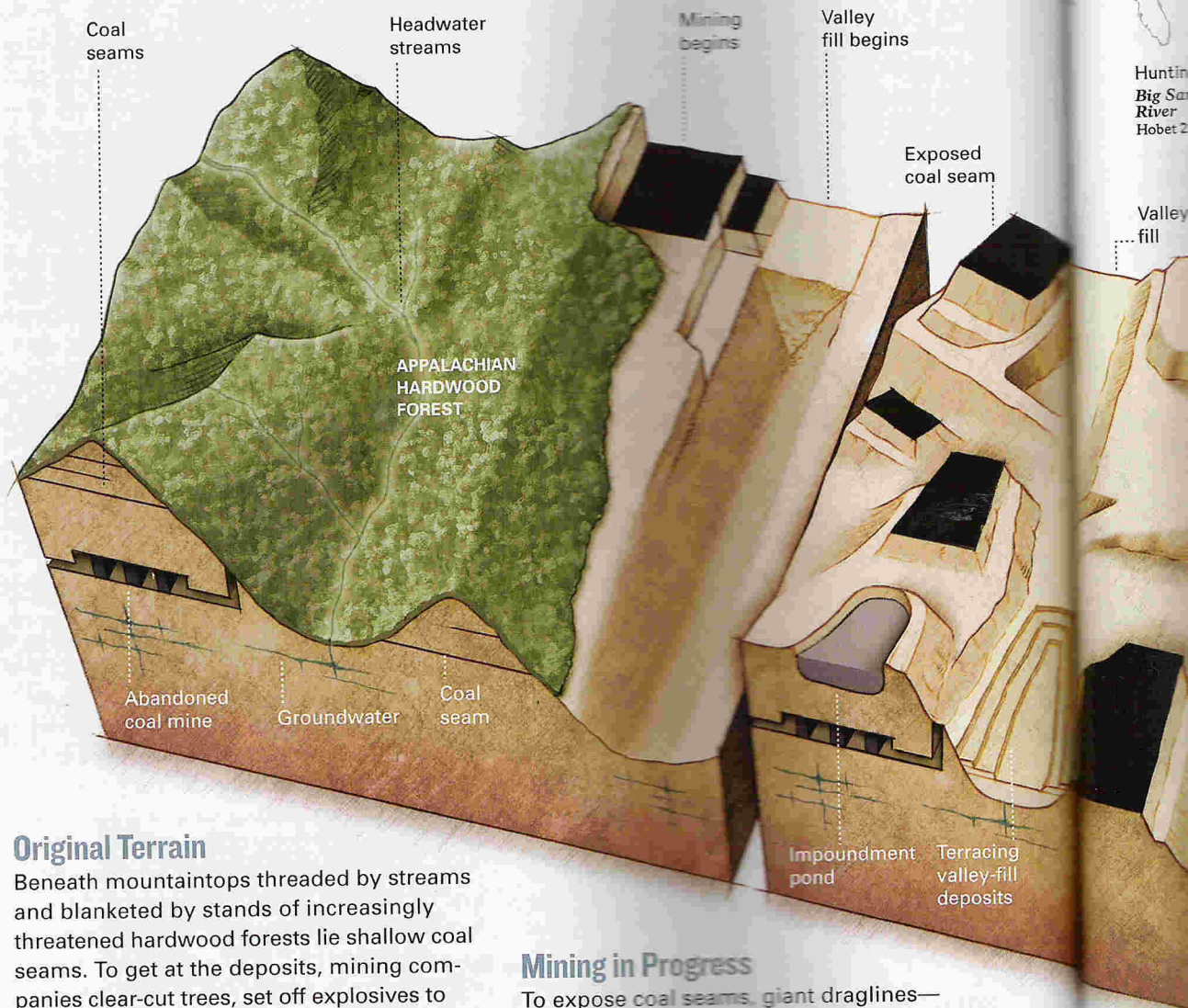
“When I was young, Sylvester was the place to be,” Canterberry said. “Everyone wanted a home here because the town was so clean. It wasn't a company town. But then Massey came into the valley, and it's been downhill ever since—in more ways than one. Now they'll take 300 feet off the top of a mountain just to get at a few feet of coal.”

After a long succession of petitions and hearings, 150 Sylvester residents prevailed in their case against Elk Run, forcing the company to pay the litigants economic damages of nearly half a million dollars and requiring it to maintain a dust-trapping dome over its processing plant and to limit the number of coal trucks passing through town to an average of 20 a day. Despite these concessions, Canterberry and some of her activist neighbors are worried about Massey's plans to expand its Elk Run operations. (Massey representatives did not return repeated phone calls requesting information on its record at Sylvester.)

Several years ago the director of the state's Division of Mining and Reclamation issued a memorandum showing that for the years 2000 and 2001 Massey incurred 500 violations, more than twice the number accumulated by the state's next three largest producers combined. Sixty-two of those violations, most involving excessive coal dust emissions, were attributed to the Elk Run Coal Company at Sylvester.

NOT FIT TO DRINK | Kenneth Stroud blames the toxic soup flowing from the tap in his home in Rawl for maladies affecting his sons and him. Stroud and some 350 other area residents are suing Massey Energy, claiming that by storing coal sludge in old mine shafts it fouled well water, a charge the company denies. Not far from Rawl, tainted water (top) flowing down a slope above Pigeon Creek is blamed on seepage from a coal refuse impoundment owned by Arch, an allegation also denied.

Moving Mountains



Original Terrain

Beneath mountaintops threaded by streams and blanketed by stands of increasingly threatened hardwood forests lie shallow coal seams. To get at the deposits, mining companies clear-cut trees, set off explosives to loosen soil and rock, and discard topsoil in nearby valleys. The result: a loss of habitat for a number of species, including migratory birds like the cerulean warbler.

Mining in Progress

To expose coal seams, giant draglines—cranelike machines measuring up to 20 stories high—remove the overburden of rock and dirt, lifting a hundred tons or more in a single bite. If the coal needs to be washed to remove impurities, impoundment ponds store the resulting toxic sludge and wastewater. The threat of a collapsed impoundment or valley fill is a concern to many living below.



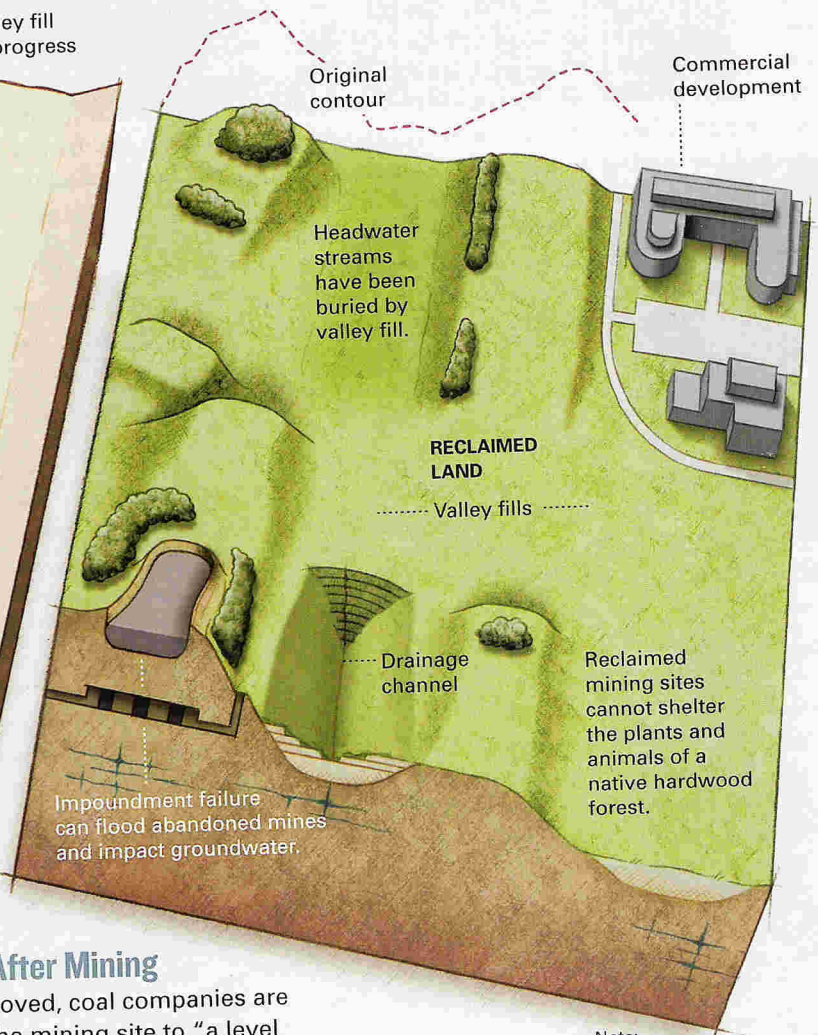
Terraced to retard erosion, valley fill rises like a dam at the edge of a reclaimed West Virginia mining site. Mountaintop mining has grown to account for a quarter of the state's annual 154-million-ton coal production.

exposed coal seam



Terracing valley-fill deposits

Valley fill in progress



Original contour

Commercial development

Headwater streams have been buried by valley fill.

RECLAIMED LAND

Valley fills

Drainage channel

Reclaimed mining sites cannot shelter the plants and animals of a native hardwood forest.

Impoundment failure can flood abandoned mines and impact groundwater.

Note: Elements not to scale

Reclaimed Land After Mining

Once the coal is removed, coal companies are required to restore the mining site to "a level or gently rolling configuration." Reclamation typically includes planting non-native grasses and scattered stands of quick-growing trees. In a few cases companies have gotten variance permits to build a factory, a prison, golf courses, and even an FBI facility.

“Now the coal companies will take 300 feet off the top of a mountain just to get at a few feet of coal.”

I GREW UP BEHOLDEN to West Virginia bituminous coal. My parents' house in Cincinnati was heated by it until they switched to oil in 1945. The coal came down the Ohio River by barge, and every wintry month or so a dump truck would deliver a big pile beside our garage. I remember helping my father cart it to the furnace inside, and the grating screech of his shovel on the cellar floor. And I remember the trail of black soot and the coal dust on my shoes. I was grateful for the warmth the coal gave us, but I hated it too because it was dirty. This was before public health and clean-air regulations obliged the mining industry to wash coal and, in Appalachia at least, dispose of the dust, dirt, and wastewater in impoundments, often perched precariously on the sides of the mountains.

There are some 500 of these impoundments in Appalachia today, more than half in Kentucky and West Virginia. Various referred to as slurry ponds, sludge lagoons, or waste basins, they impound hundreds of billions of gallons of toxic black water and sticky black goo, by-products of cleaning coal, mostly from underground mines but also from surface mines. Mountain folk residing downhill from these ponds worry about what a flood of loose sludge might do—and has already done in a number of tragic cases.

In Logan County in the winter of 1972, following two straight days of torrential rain, a coal-waste structure built by a subsidiary of the Pittston Coal Company collapsed and spilled 130 million gallons into Buffalo Creek. The flood scooped up tons of debris and scores of homes as it swept downstream. Survivors recalled seeing houses bob by, tilted in the swift current, the doomed families huddled at their windows. The final count was 125 dead, 1,000 injured, 4,000 made homeless. The Pittston Company called the disaster an “act of God.”

In neighboring Kentucky on an October morning in 2000, the bottom of a waste pond near the town of Inez collapsed, pouring 250 million gallons of slurry—25 times the amount

of oil spilled in the *Exxon Valdez* disaster—into an inactive underground mine shaft. From there the slurry surged to the mine's two exits and flooded two creeks hell-bent for the Tug Fork of the Big Sandy and the Ohio River beyond. Miraculously, there was no loss of human life, though 20 miles of stream valley would be declared an aquatic dead zone, water systems in ten counties would have to be shut down, and the black slick would eventually reach out toward the riverfront in Cincinnati. Lawyers for the Martin County Coal Company, a Massey subsidiary and owner of the impoundment, blamed the accident on excessive rainfall, which was simply another way of saying what had been said at Buffalo Creek. It was God's fault.

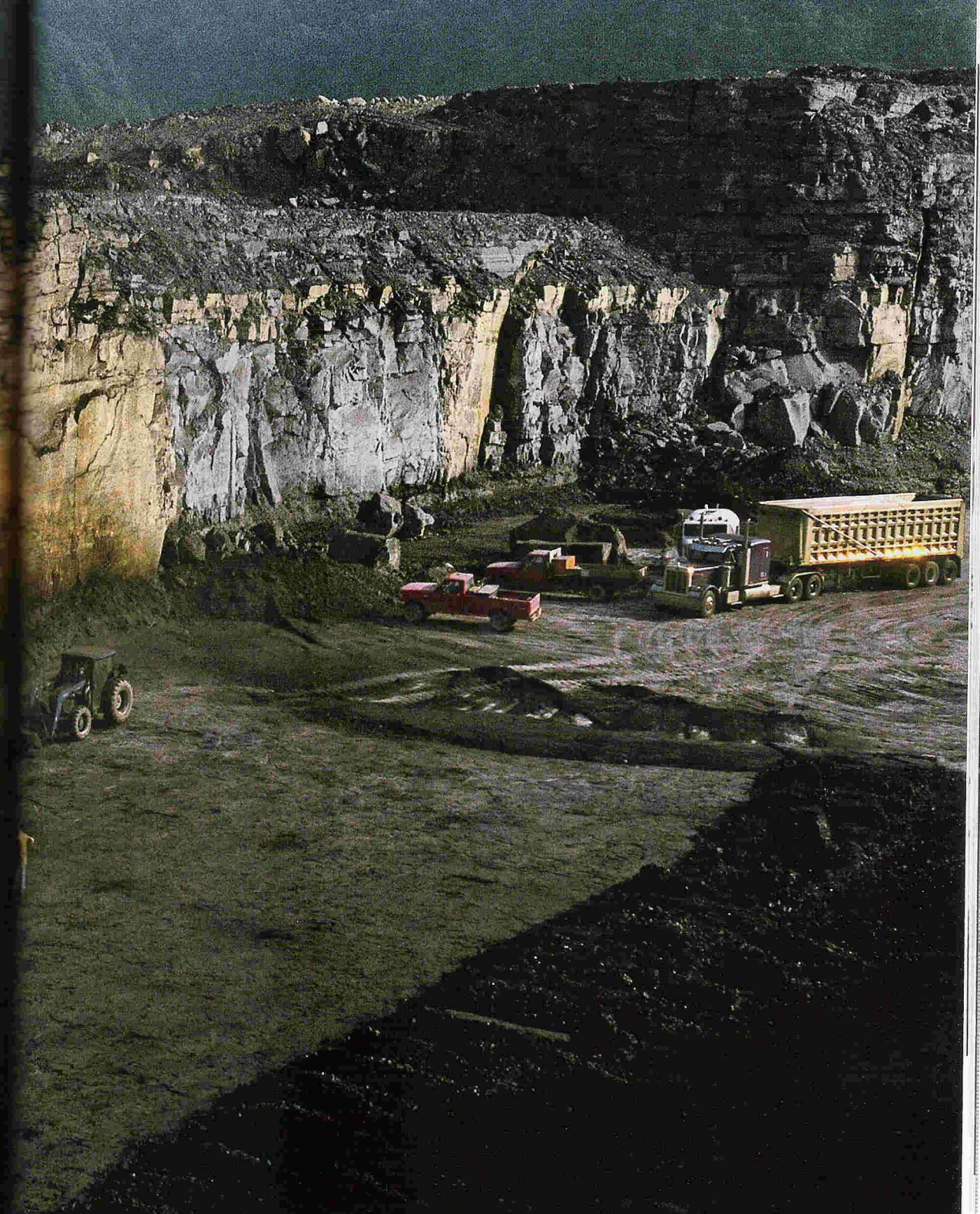
Fear of impoundment failures haunts the collective memory of West Virginians. “I'm convinced something awful's going to happen again,” Freda Williams was saying the day I called on her at her tidy brick house beside a tributary of the Big Coal River, just south of Whitesville. One of the largest waste basins in the state, the Brushy Fork slurry lagoon, owned by Massey Energy, impounds some eight billion gallons of blackwater sludge about three miles upstream from Williams's home.

“What's going to happen to all that water if the dam breaks or the basin collapses into an abandoned underground mine?” By some accounts, should the Brushy Fork impoundment ever fail, a wave of sludge 25 feet high could roll over Whitesville in no time flat.

RESHAPING THE LAND | Twisted Gun public golf course in Mingo County (top right) smooths away scars left by the kind of mountaintop mining that still goes on beside it. Searching for native ginseng (right) is a West Virginia tradition with diminishing returns. While deer and overharvesting have taken a toll on the plant, whose root is prized as a medicinal, mining destroys the forests where ginseng grows.







CLEAN SWEEP | Workers for JMAC Leasing use nothing more than shovels and brooms to remove dirt and rock from coal at Joe's Branch mine. "The cleaner we keep it, the more we get for it," says Gordon Justice, who took over the site after a large, highly mechanized firm left. "I get \$50 a ton and up, depending on the quality." But it's hard to find the workers he needs. "Mountaintop removal is just easier work," he says.



Should the Brushy Fork impoundment fail, a wave of sludge 25 feet high could roll over Whitesville in no time flat.

Two other Massey waste impoundments pucker the slopes of the Big Coal Valley. The one at Sundial looms directly above the Marsh Fork Elementary School, with an enrollment of 240 children, from kindergarten through fifth grade. Though Stephanie Timmermeyer, chief of the state's Department of Environmental Protection, has claimed that the Massey facility poses no threat to the schoolchildren, the agency's own rating system lists the dam as a Class C facility, meaning its failure could reasonably be expected to cause loss of human life.

BESIDES THE RAW SCARS of the mines themselves, the most startling features of coal country are not necessarily those blackwater basins but the mountain-topped valley fills that have buried hollows and headwater streams under millions of tons of broken rock. Critics fear some fills could eventually come tumbling down in landslides of unpredictable proportions. As one Kentucky attorney likes to put it: "A valley fill is a time bomb waiting to happen."

One of West Virginia's biggest time bombs reaches more than two miles down what used to be, when it was flowing free, the Connelly Branch of Mud River in Lincoln County. The fill represents part of a mountaintop the Arch Coal Company unhinged to create the 12,000-acre Hobet 21 mine, one of the largest surface mines in West Virginia. But Hobet 21, now owned by Magnum Coal, has another distinction: For several years it's been home to "Big John," an

earthmoving machine with a 20-story dragline and a bucket scoop that swallows over 100 tons of soil and rock in a single bite.

Up the Mud River a short way, a tributary known as Laurel Branch flows sweet and clear beside a weathered white-frame farmhouse. The front porch overlooks a garden of corn and potatoes. From the porch in the spring you can hear the vernal murmur of the creek, though not when the farmhouse is crowded, as it was at the time of my visit, with kin of the Caudill-Miller clan gathered at a place that has been in the family for a hundred years. Leon and Lucille Miller preside as host and hostess for these occasions. She is one of the surviving heirs of John and Lydia Caudill, who inherited 75 acres abutting the Mud and built this farmhouse in 1920. Lucille was raised here, along with nine siblings. But now, for all the copious country food and Caudill hospitality, an explicable uneasiness lingered at the edge of the festivities. Moving to expand its Hobet 21 operation, Arch Coal had informed the Millers that it was looking to do with Laurel Branch what it had done to the Connelly. And Arch wanted the Caudill homeplace out of the way.

"They want it all," Leon Miller told me, "the house and everything. And we're saying, 'No.'"

Since that particular May reunion a few years ago, I have been following the ups and downs of the Millers' struggle to stop Arch Coal from burying Laurel Branch and the ancestral home under the shadow of Hobet 21. Arch did succeed in buying out some of the Caudill heirs, thereby acquiring a two-thirds interest in the 75 acres. But when Lucille Miller and six of the heirs continued to say "no," Arch's Ark Land Company filed a lawsuit in Lincoln County Circuit Court arguing that the holdouts should be forced to sell their interests because coal mining was "the highest and best use of the property" and because the cost of protecting the nearby Miller-Caudill land from mining waste would be prohibitive for Arch. Besides, the company's attorneys said, the heirs did not live at the farm but used

FIGHTING BACK | Attorney Brian Glasser briefs residents of Sylvester on their suit against Elk Run Coal Company. For three years local "dust busters" wiped outdoor surfaces, saving the dust spewed by a coal-processing plant. A court ordered the company to maintain dust-control equipment and pay \$473,000 in damages for reduced property values. Residents in Switzer were not so lucky: Heavy rains washed valley fill onto a roadway (left).

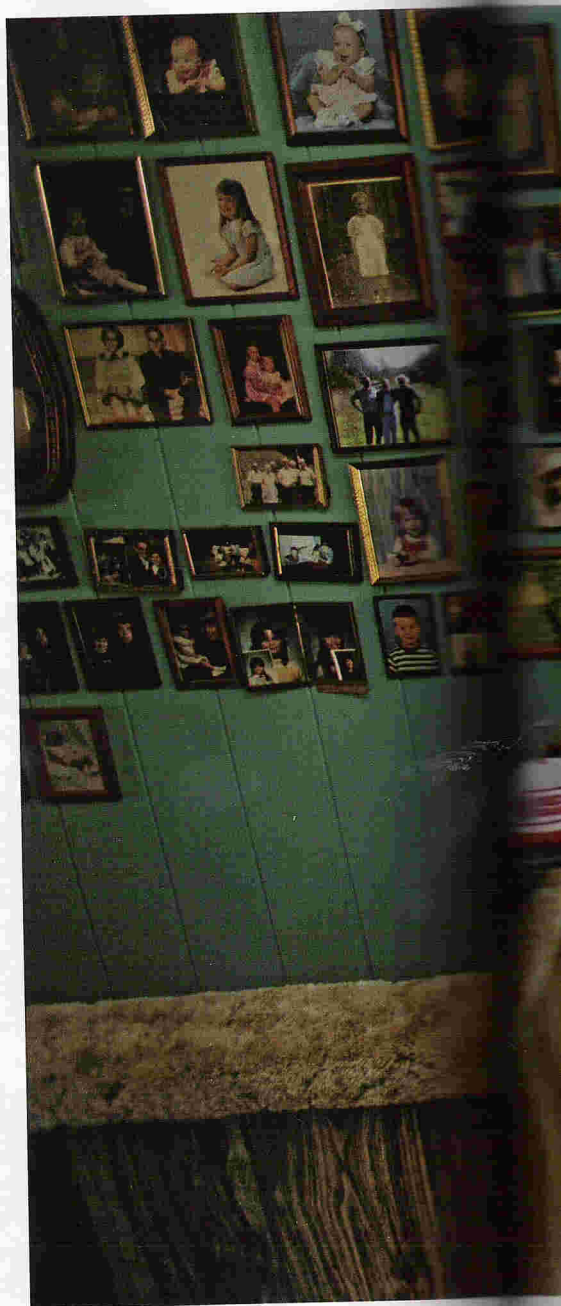
it only on weekends and other occasions. The circuit court ruled in the company's favor and ordered the property sold at auction. Arch got it. The Millers appealed to the state supreme court and won a reversal of the lower court's ruling. The farmhouse still stands, and the Laurel still murmurs, at least for now.

While Millers and Caudills rallied round their embattled homeplace, a larger but not unrelated issue was unfolding in federal courts and among the agencies responsible for regulating coal mining under the Clean Water Act and the Surface Mining Control and Reclamation Act of 1977 (SMCRA). Under "Smackra," as the act is known, environmentalists contend that the U.S. Office of Surface Mining should enforce a buffer-zone rule prohibiting, in all but the most exceptional cases, any mining activity within one hundred feet of a stream. Under the Clean Water Act, the Army Corps of Engineers was supposed to regulate the actual filling of the streambed itself. Perceiving a lack of enforcement on both counts, opponents of mountaintop mining in West Virginia have been in and out of court for the past five years, occasionally winning a legal round only to have it set aside on appeal by attorneys for various agencies and the coal industry.

In or out of the courtroom, the argument often boils down to differing opinions as to what constitutes a regulated stream in Appalachia, how vital its uppermost reaches might be to the ecological health of the downstream watershed, and finally the degree to which valley fill might contribute to flooding in a peak storm event.

The defenders of valley fills argue that most of these structures affect intermittent streams only and therefore do not fall within the reach of the Army Engineers and the Clean Water Act. William Raney, president of the West Virginia Coal Association, believes many fill areas are simply "dry hollows" for most of the year, implying that they serve little ecological function.

But that's not the way Ben Stout, a biology professor at Wheeling Jesuit University, sees it. According to Stout, aquatic insects in seep springs





GIVING UP | The stress of living next door to the Hobet 21 mine proved too much for Lorene Caudill, packing to move from the house she and her husband, Therman, built along the Mud River in 1966. "There was so much dust," she says. "The blasts came in the morning and evening. They rattled dishes like an earthquake." A mine company guard now lives in their former home.



at the top of a watershed feed larger life-forms by shredding leaf litter and sending the nutrient-rich particles downstream. “These insects provide the link between a forest and a river,” Stout says. “Bury their habitat and you lose the link.”

The issue of flooding also evokes conflicting views. Raney sees no connection between mountaintop mining and floods. “Science doesn’t bear that out,” he told me during an interview in his Charleston office. “What causes flooding is too much water falling in too short a time.”

Yet a study by federal regulators, obtained by the *Charleston Gazette* through the Freedom of Information Act, predicted that one valley fill at the Hobet 21 mine could increase peak runoff flow by as much as 42 percent. Vivian Stockman, a project coordinator with the Ohio Valley Environmental Coalition in Huntington, contends that 12 West Virginians have died since 2001 because of floods related to mountaintop mining. “Old-timers will tell you property that has

A TOWN CREMATED | The community of Dehue, where miners’ homes were owned by their employer, Dingess-Rum Land Company, was razed to make room for a new processing facility in a state dominated by King Coal.

been in their families for generations never flooded severely until mining began upstream,” Stockman says. “It’s common sense. Denuded landscapes don’t hold water the way forests do.”

It was not the intent of Smackra, of course, to allow coal companies to walk away from their surface mines and leave them denuded. Stripped mountainsides, the law declared, must be restored to their “approximate original contour” and stabilized with grasses and shrubs, and, if possible, trees. But putting the entire top of a topped-off mountain back together again was an altogether different—and more expensive—matter. So mountaintop mines were given a

“They’ve stripped off hundreds of thousands of acres but put less than one percent of it into productive use.”

blanket exemption from this requirement with the understanding that, in lieu of contoured restoration, the resulting plateau would be put to some beneficial public use. Coal boosters claimed the sites would create West Virginia’s own Field of Dreams, seeding housing, schools, recreational facilities, and jobs galore. In most cases it didn’t work out that way. The most common “use” turned out to be pastureland (in a region ill-suited for livestock production) or what the industry and its regulators like to identify as fish and wildlife habitat.

“The coal companies have stripped off hundreds of thousands of acres,” says Joe Lovett, an attorney for the Appalachian Center for the Economy and the Environment, “but they’re putting less than one percent of it into productive use.”

Yet the industry should get some credit for what it’s managed to accomplish in post-mining land use over the years. It’s provided a number of West Virginia counties with the flat, buildable space to accommodate two high schools, two “premier” golf courses, a regional jail, a county airport, a 985-acre complex for the Federal Bureau of Investigation near Clarksburg, an aquaculture facility, and a hardwood-flooring plant in Mingo County that now employs 250 workers.

“Economically, we were dying on the vine,” said Mike Whitt, executive director of the Mingo County Redevelopment Authority, as we toured the 40-million-dollar flooring plant, financed by grants from federal, state, and local governments and by private investors. “So we got OPM—other people’s money—to get the job done. Without the infrastructure to create jobs, you’re out of the game.”

One emerging idea to help keep this underemployed region in the game is commercial forestry—restoring the land not as pasture or golf course or school but as a reincarnation of what used to be here in the rich diversity of the Appalachian forest. Arch Coal, with test plantings already established east of Whitesville, reports it’s eager to pursue this option. “Our

intent,” says Arch’s Larry Emerson, “is not just to approximate what was there before mining but, for the long range, establish a commercial forest.”

Some foresters are not convinced that Arch is willing to go far enough in its romance with reforestation. James Burger, a professor of forestry at Virginia Tech University and a zealous proponent of turning topless mountains into productive forests, has found in his studies that weathered brown sandstone soils—making up a mountaintop’s uppermost layer and therefore the first to be dumped and lost in a valley fill—would be better set aside and used, without compaction, as top dressing for any reforestation. But Arch’s forestry consultant argues this would raise substantially the per-acre cost of reclamation.

A few environmentalists, such as Joe Lovett of the Appalachian Center, hail Burger’s crusade for reforestation as the next best thing to stopping mountaintop mining altogether. Others view it as a cop-out exercise in wishful thinking. “I understand what makes up that forest, and it’s not just trees,” says Judy Bonds of Coal River Mountain Watch. “I’m talking about the herbs and the plants that evolved here in this forest over thousands of years. Re-create *that* forest? You couldn’t do it in 1,500 years.”

Standing in the doorway of the Mountain Watch office on the main street of Whitesville, I listened to Judy Bonds reminisce about the way it was 50 years ago when she was a child. “I used to swim in the Coal River then,” she said, “but now it’s so full of silt that the water barely comes up to your knees. It breaks my heart. I look at my grandson, and I see that he’s the last generation that will hunt and fish in these mountains and dig for ginseng, and actually know mayapple when he sees it. These mountains are in our soul. And you know what? That’s what they’re stealing from us. They’re stealing our soul.” □

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