

Scenes from a Global Gold Rush

By Daniel Glick

An insatiable global demand, improved technology, widespread poverty and soaring gold prices are fueling the biggest gold rush in human history. The unintended consequences reverberate across six continents.

This 21st century gold craze comes with a steep ecological and social price tag, including mile-wide open pits bulldozed by multinational companies, poisoned landscapes left by abandoned mines, and millions of poor families exposed to toxic mercury vapors. Has the real cost of excavating gold finally exceeded its value to civilization? Is it possible to satisfy our gold lust in a less destructive fashion?

Before you settle in to read this story, please do something. Go find some gold that you already own. Perhaps a gold band reassuringly encircles the ring finger of your left hand; maybe an heirloom gold necklace nestles in your grandmother's jewelry box. If you're already a bit of a gold bug, you might have a few American Eagle gold coins or some Degussa 10-gram bullion bars hidden away in a safe place.

Retrieve some of your gold now. Hold it in your hands. Admire it.

It's beautiful, isn't it? This ore, this...element... is flat-out scintillating. With a glint of light caressing its signature yellow sheen and the surprising weight of it in your hand, it's easy to understand why gold has adorned the most beautiful humans who have ever lived, engendered bloody conquests, and forged fortunes from mountainsides. During almost any epoch of human civilization, you could find somebody willing to exchange your gold for food, for clothing, for weapons. For practically anything.

Wherever gold has ever been discovered, you will also find a dark story of power and greed, of ecological ruin and human struggle. Today, with the price of gold hovering at historic levels and global demand fervent, the true cost of new gold has risen commensurately. For communities across the globe swamped by gold's turbulent wake, the price tag for jobs and economic activity also includes pockmarked mountainsides, toxic tailings, disease and murderous conflicts. Technological improvements, from more powerful earth-moving machinery to lasers that track the stability of deep pits, have enabled companies to run 24/7 mechanical juggernauts in the world's most remote places. These expanding scales of operation have profound implications, especially as the last few decades have seen the rapid rise in what is essentially microscopic gold mining, which utilizes industrial quantities of the poisons arsenic and cyanide to facilitate profitable mining of extremely low-grade ore.

As it always has, gold evokes a series of paradoxes. The element AU is so rare that all the gold mined in the history of the planet would only fill three Olympic-size swimming pools, yet it is found in nearly half the countries in the world on six continents. Gold is mesmerizing to behold, yet at least 32,000 tons in gold bars remain locked in central bank vaults, more than 30 years after world currencies

were taken off the “gold standard” – an anachronistic commitment by key countries to fix the prices of domestic currencies to a specified amount of gold. Gold is universally coveted, yet has few indispensable industrial uses and the vast majority is used for jewelry and ornamentation. Multinational mining companies now strive to apply standards of corporate responsibility and sustainable development to mining operations, yet increasingly work in countries plagued by endemic corruption and ineffectual environmental laws. The stark truth is that “sustainable gold mining” remains a tragic oxymoron.

The events of 9/11 ushered in a new era in gold’s turbulent history. In the span of five years, the price of gold rose more than 260 percent – the result, analysts say, of global jitters, rising U.S. debt, skittish currencies and political instability. Meanwhile, the modern era of globalization continues apace, and mergers and acquisitions have created giant multinational mining companies with gross revenues that exceed the GDP of countries where they operate.

At the other end of a long gold mining spectrum, an estimated twelve to fifteen million people eke out a living as small-scale, or “artisanal” miners in places where few alternative livelihoods exist. Marcello Veiga, a mining expert with the United Nations Industrial Development Organization (UNIDO), estimates that 100 million people -- one out of every 65 humans -- directly or indirectly relies on the search for gold to survive. Today, three quarters of world gold production occurs in places where the average income does not exceed two dollars per day.

Whether fueled by the lure of vast wealth or driven by the crushing weight of poverty, 21st century gold prospectors operate in the most remote, inhospitable and politically unstable parts of the planet. “The gold is gone in safe places where it’s easy to get,” says Luc Zandvliet, a corporate responsibility consultant who works for several large gold mining companies. What that means is that the days of stumbling across fist-sized nuggets in Klondike streams, Mother Lodes in California’s Sierra Nevada, or 40-mile long underground gold reefs in South Africa are likely the stuff of history. It also means that the social, environmental and logistical costs of finding and digging new gold are skyrocketing.

Most modern gold comes from a painstaking process of sifting through tons of dirt in order to find 15-micron-diameter flecks of gold. (A low-grade ore deposit consists of five parts gold to a *million* parts earth; 20 tons of earth must be excavated to create one gold ring.) Miners amalgamate the gold flecks with mercury or cyanide or arsenic, separate the gold by burning or through chemical processes, and then place the gold on the world’s labyrinthine gold markets from Dubai to Shanghai, New York to New Delhi. The mercury, arsenic, cyanide and heavy metals that are the byproducts of gold mining, meanwhile, are often loosed into the air and water before infiltrating the body tissues of humans and animals.

UNIDO’s Veiga, whose work focuses on reducing the amount of the neurotoxin mercury that poor miners utilize to separate grains of gold from tons of earth, says this confluence of poverty, population growth, failed states and gold’s eternal lure means that more people are digging for smaller concentrations of gold in more destructive ways in more places. The ominous result: “We are in the middle of the biggest gold rush in the history of humanity,” he says.

Today, the value of gold, like beauty itself, remains in the eye of the beholder:

- For mining engineers, modern mines embody the dream of alchemy on an industrial scale; unimaginably vast complexes that transmute mountains of rock and dirt into molten gold twenty-four hours a day, seven days a week.
- For wedding parties in Bangladesh and India and Kazakhstan, gold continues to be, as it has for centuries, as indispensable as the bride and groom.
- For a peasant woman in Sudan widowed by war, gold represents portable wealth, her wedding gifts exchangeable at the gold souks in Khartoum for money to buy her children's breakfast.
- For "gold bug" investors, bullion remains a bulletproof commodity to hoard as a hedge against volatile world currencies and expanding global conflicts.
- For hundreds of communities like Farabakouta, Mali, Tarkwa, Ghana, Tambo Grande, Peru and Rosia Montana, Romania, gold is a synonym for forced relocation and violent confrontation.
- For millions of impoverished rural families, sifting a few grams of gold from the earth represents the only viable alternative to starvation or migration.
- For environmentalists, modern industrial gold mining creates giant gashes in the earth, producing chemical soups of cyanide, arsenic and mercury and an enduring legacy of pollution, ecological calamity and human suffering.
- For the CEOs of multinational mining firms, gold is the stuff of dreams, of stock options, investor confidence and the just reward for intrepid exploration and risk-taking. "It's only a giant gash if you don't have equity in it," Maureen Upton, a former spokesperson for Newmont Mining Corporation told me in an unguarded moment while visiting Newmont's giant Batu Hijau mine in Indonesia.

The current gold boom continues to ricochet around the world, bringing with it a boom of problems: human rights violations, community strife, financing of rebel wars, and the enduring poisoning of rivers and groundwater. If you read through these scenes from the global gold rush, you may never look at your ring the same way again.

For Awudu Mohammed, gold might have been invented by the devil himself. I met him on the dusty streets of Sansu in the gold mining district near Obuasi, Ghana, an African Everyman in our modern gold story. The 25-year-old with sad eyes and a soft voice lifted his shirt to unveil scars on his belly where, he claimed, he had been shot while searching for gold on a concession owned by South Africa-based AngloGold Ashanti, one of the world's largest gold companies. A ragged scar etched itself along Awudu's stomach, where he said his intestines once hung out of the exploding exit wound. Then he turned around to display a neat, compact circle that looked like a scar where a bullet might have entered his back.

As we talked, through a translator from his native Dagbani, his story eerily

resembled dozens of others I would hear elsewhere in Ghana, in Indonesia, and in reports and testimony from Peru and Papua New Guinea, Tanzania and Guatemala, even Nevada and Alaska. Awudu's tale seemed to embody in one distressed man's plight the fate of countless others, another person for whom there was little glitter to the gold that lay buried in his homeland. His tale evoked the human rights abuses, power politics, environmental damage and economic inequities associated with so many large gold mining operations around the world. Awudu's story mirrors that of millions of others who operate at the fringes and intersections of giant mines and rural poverty.

In 1995, Ashanti Goldfields Corporation, which was taken over by AngloGold in 2004, gained a gold mining concession that included 15 acres owned by Awudu's father, who grew cocoa for a cash crop and cassava and plantain for sustenance in the green Ghanaian countryside. He was compensated 500,000 Cedis, or about \$55. With no steady crop income, he could no longer pay school fees for his son after junior secondary school, when Awudu was 15. (In Awudu's district of Tarkwa alone, more than 30,000 people were displaced by gold mining operations between 1990 and 1998, according to the WorldWatch Institute.)

Awudu points up the hill past the village to his father's farmland, now a pile of mining waste. The water supply for Sansu and the surrounding countryside had been virtually cut off by impoundment and tailings ponds built by the mining companies. Acid mine drainage, the pervasive chemical result of exposing sulphide-bearing ores to air or water during mining, rendered much of the other water unusable to the community. When sulphides oxidize they become sulphuric acid, which often dissolves heavy metals that occur naturally in gold-bearing rock, such as lead, zinc, copper, arsenic, selenium, mercury and cadmium. These metals, once released, can wreak havoc up and down the food chain.

Like many of his peers, Awudu struck out to find a few grams of gold by becoming a *galamsay*, or artisanal miner, in and around the AngloGold fields. "We are all unemployed now," he says. "The only way to survive is to do galamsay to buy food."

One day, he and some friends were admittedly inside the AngloGold concession illegally, sifting through the waste pile, when armed guards arrived. The young men scattered, but Awudu felt a piercing pain in his gut and fell. Police and AngloGold's guards approached, and one slammed Awudu in the head with the butt of an AK-47, apparently unaware he had been shot. When they realized he was bleeding, they took him to a hospital in Kumasi, 45 minutes away. Awudu could hear them talking about him as he hovered on the edge of consciousness, plotting to say that this trespasser had impaled himself on the ragged point of a barbed wire fence.

That was the story put out in press releases by AngloGold.

Local activists said Awudu had been shot and the company was covering it up.

I pressed for more details from Awudu, and asked him for corroborating witnesses. Everybody was too scared to talk, he said. Police had beaten another galamsay to death the year before, and attack dogs had been released on other miners. I asked if I could speak to his doctor, and was told that he was probably in

the pocket of AngloGold and wouldn't tell the truth, anyway.

I sought out the local chief, Nana Bawua Afiamoa Kotokuo, whom many in the village had accused of taking bribes from AngloGold Ashanti in return for his support. He did not want to talk about what happened to Awudu Mohammed, because he said he did not know with certainty and awaited the official report.

The reticent chief, who traditionally held the pinnacle of regional power in the ancient Ashanti Kingdom, then launched into a spontaneous diatribe against AngloGold. "Their social responsibility is zero," he said, adding that even as chief, he had very little leverage to address a litany of problems caused by the industrial mines, especially the loss of farmland and clean water, which created a cascade of social problems, from unemployment to diseases. "The company is too strong," he sighed, "and the government is on the side of the company."

Whether or not it turned out that a bullet maimed Awudu Mohammed, the chief said, tensions across the region were rising and he had repeatedly expressed his concerns to AngloGold. "I made it clear to them that the company is sitting on a time bomb," said Nana Kotokuo.

For more than a week after I met Awudu and his chief, I toured surrounding villages that had been affected by mining, speaking with mining officials, shopkeepers, galamsay miners, assemblymen, other local chiefs, mothers, grandmothers, and activists. Wherever I went, stories of indignity, powerlessness and violence or the threat of violence cascaded out. In Dumasi, a second huge cyanide spill in three years had polluted the river and killed most of the fish in it. In Prestea, I visited the family of a doe-eyed four-year-old named Joyce Oboako, barely able to sit up by herself on a patch of dirt shaded by a palm awning, because she had suffered brain damage two years previously when she fell from her bed during mine blasting by Bogoso Gold Limited (BGL), right on the edge of town. (BGL is a subsidiary of Golden Star Resources, a Canadian company with offices in Colorado, and exemplifies the kind of convoluted ownership structures in the gold mining world that, critics say, create appalling loopholes in accountability.) Her father, 43-year-old Alhassan Oboako, described to me his Kafkaesque efforts to get the company to help with her medical care, including his discovery that the company had taken all the documents he and his wife had filed with the town government and the hospital immediately after the accident. Alhassan said he is not seeking anything but what any father anywhere in the world would ask: "All I want is for my daughter to be able to walk and talk," he said, his voice a choked whisper.

Prestea's traditional chief, 65-year-old Nana Adamu Huhu-Odikro, later corroborated Alhassan's story and added that he personally, along with his Queen Mother, intervened on the little girl Joyce's behalf, to no avail. He says that anybody who still believes that gold mining provides a net benefit to communities is welcome to come to Prestea. "Here, there is no legacy to point at that the company has done for the community except for the things that have harmed us," he said.

BGL spokesman Magnus Adjah Kodjoe expressed frustration about the multitude of claims made by the townspeople. "Every issue they have they blame on the mining company," he said. He said the company tried to help the community with service projects and hired as many people as possible, but the region was poor and the company could not help everybody. In the case of the little girl Joyce, he

demurred. "We cannot say for sure that it is the impact of the blast that caused it," he said.

Near Prestea, I visited a galamsay camp where hundreds of boys and men crawled caked with mud from underground shafts, working in shifts, digging around the denuded landscape. Men lined up to tell me of periodic raids by the police and military, where beatings with sticks and boot stompings were routine. Elsewhere, locals walked me along muddy trails to see giant scars from un-reclaimed gold mining sites, and told me of increased malaria in places where huge mining pits had filled in with water that attracted mosquitoes. At Jimiso dam, one of the mosquito breeding pits, a company-placed sign read: "Don't Swim. Don't Fish. Don't Drink." In a dirt-poor village of Binsere – "the place where nobody laughs," 50-year-old Akwasi Bioh told me how one day, his seven-acre palm, cassava and orange farm was overrun by mining company workers, who offered him about \$20 for his land and would not take "no" as an answer. Akwasi turned to illegal galamsay work, and like Awudu Mohammed's father, now cannot pay school fees for his five children. I saw company-supplied black plastic cisterns containing water "the color of CocaCola," as one villager put it, a half-hearted attempt to compensate for mining operations that choked off rivers that once ran through ancient human settlements. Local Assemblyman Benjamin Annan summed up the plight of so many who had suffered from the gold companies' presence in the region, whether from losing farmland, water resources, or simply a way of life: "They destroyed the place," he says. "What wasn't destroyed was contaminated."

What struck me about what I witnessed in Ghana was, tragically, that it was not one of the worst-case scenarios in the gold mining universe. In the Democratic Republic of Congo, AngloGold Ashanti had been severely criticized for much more egregious human rights abuses by Human Rights Watch, including paying protection fees to armed rebels who were fighting the government. Their report, "The Curse of Gold," also details how the fight for control of Congolese gold has been the proximate cause for widespread human rights abuses committed by rival militias, including forced labor, rapes, beatings and executions. (AngloGold responded to the 2005 report by acknowledging an extortion payment and expressing regret, but also by insisting that their continued presence would help with much-needed economic development.) In Yanacocha, Peru, corruption at the highest levels of government helped U.S.-based Newmont Mining Company gain access to a deeply contested mining concession that subsequently resulted in a disastrous mercury spill and alleged death threats against mining opponents, among other problems. Virtually every large gold mining company operating on any of six continents has created deep divisions and/or environmental harm in the communities where they operate. The benefits touted by mining companies and international lending institutions like the International Finance Corporation of the World Bank, like mining jobs and ancillary economic activity, frequently come with a giant asterisk for the local populace.

A few days after I left Awudu Mohammed, his friend Issah Raman, who was present when Awudu was allegedly shot, spoke with me despite fears of retribution. His story matched Awudu's and filled in more details. He described the panic he and his friends felt that night when the guards arrived and bullets started flying. He

remembered Awudu saying, *ajyae wake me* (“they have killed me”), before Issah hid in the rocks nearby and then ran off to tell Awudu’s family of his death.

Before going back to the capital Accra, I tracked down the doctor who treated Awudu in Ghana’s second-largest city, Kumasi. At the Komfo Anokye Teaching Hospital, Dr. Edmund Turkson was not in. A taxi driver who knew the doctor offered to take me to his home.

I asked Dr. Turkson if he remembered treating Awudu Mohammed.

“Yes,” he replied.

“Can you tell me what happened to him?”

“Oh, yes. He was shot.” The doctor added that it appeared that Mr. Mohammed had also received blunt trauma to his head, consistent with a blow from a rifle butt.

I thanked him and went to Accra, where I arranged a meeting with Y.B. Amponsah, AngloGold Ashanti (Ghana) general manager for human resources at their Obuasi mine, and public affairs manager John Owusu. In the bar of the Golden Tulip hotel, “YB” wore all white, down to his roadster caddy hat, with gold chains around his neck and a hefty gold wristwatch. Owusu was a massive man who downed several beers as we spoke.

After some general talk about the difficult relationship between AngloGold and the galamsay, I asked about Awudu Mohammed.

Owusu said that the man had injured himself climbing over a fence while trespassing on company property.

I explained that I had just come from the doctor who had treated Awudu, and that the doctor definitively told me the man had been shot.

“If he had been hit by an AK-47 at that distance, he would be dead,” said YB.

Apparently not, I said. The doctor was quite certain.

The two men seemed unperturbed, and stuck with their story despite overwhelming evidence to the contrary. “People should not expect us to behave as if we are in America,” YB told me, wagging a finger at me. “Because we are not in America.”

[Months later, Dr. Turkson and colleagues released a final report confirming that Awudu Mohammed had been shot, probably by an AK-47.]

Across the Indian Ocean from Ghana, in Indonesian Borneo, I witnessed a different but no less disturbing side of the global gold mining coin. In a remote place called Galangan, gold fever has transformed a formerly forested swath of equatorial forest into a pockmarked and poisoned landscape half the size of Manhattan. Here was abundant evidence of two of the largest problems stemming from our modern gold rush: the widespread use of the neurotoxin mercury and the unregulated rush to dig up any landscape that might come between a poor miner and a few flecks of golden ore.

One humid afternoon, I traveled from the isolated mining town of Kerang Pani to the stark landscape of the miners’ realm, following the suggestion of a road, with rudimentary bridges made of timbers lashed together by motorcycle chains. The chugging of distant diesel motors became a cacophonous symphony of generators and pumps crashing through the rural countryside as we approached an

area where the miners concentrated. Dotted along the road sat collections of small, wooden shacks with rattan roofs, sometimes covered with blue plastic and plunked on high ground in between ponds of fetid water created by previous dredging. Every few kilometers, a tiny shop appeared, selling cigarettes and strawberry Fanta and ramen noodles.

Thousands of miners have set up camp in and around Galangan, collectively creating a moonscape of ecologically devastating gold mining sites. These are the *gurandil* of Indonesia, similar to the galamsay in Ghana and the *garimpeiros* of Brazil: small-scale miners who, some twelve to fifteen million strong, account for an estimated 20 to 30 percent of world gold production, between 500 and 800 tons.

Because of the way they produce much of that gold, they also account for about one-third of global man-made mercury releases, between 650 and 1,000 tons per year. (For every ounce of gold produced by this method, one to three ounces of mercury is released into the environment.) Mercury is then transported through air and water to virtually every part of the planet, causing long-term health and ecological hazards, poisoning children, causing birth defects, and sending tremors through men literally grown shaky from exposure to this neurotoxin.

Central Kalimantan had become notorious in the mid-1990s for what became known as the Bre-X scandal. After word leaked that a “junior” exploration company had discovered a \$70 billion gold deposit, the company’s stock price soared from fifty cents to \$286 a share. The bottom dropped out in 1997, when the story unraveled: the “find” was a complete fraud that had sucked in people from the highest levels of several governments, across the gold industry, and high-roller investors around the world. This cautionary tale of *Treasure-of-the-Sierra-Madre* madness that infects people around gold still reverberates in the region.

Despite Bre-X’s false promise, over the past 15 years, gold’s lure has drawn thousands of gurandil to the area. Many arrive from the overcrowded and unemployment-plagued island of Java, lured by the prospect of meager miners’ pay rather than even more meager prospects at home. Time-lapse aerial photography tells a stark tale: since 1990, at least 166 square miles (430 square kilometers) around Galangan has been transformed into a gouged, denuded and cratered landscape.

Pa Adam, a local schoolteacher, introduced me to a man he called “Mr. Big,” a jovial entrepreneurial miner with a bright Hollywood set of teeth. Mr. Big owned two “units” of gold sluicing machinery that included two pumps, hundreds of feet of piping and a 40-foot long sluiceway, built on poles from skinny trees strapped together like precarious scaffolding. We watched his workers, a team of seven sweating young men inured to the deafening sound of chugging diesel pumps and days spent knee-deep in mud and muck. Sidestepping puddles and eroding hillsides, we returned to the cluster of shacks where Mr. Big, his family and his workers had contrived a makeshift tiny village.

At the end of the day, as the diesel smell clung to the equatorial heat and mingled with churning wet sand and rushing rust-colored water, Mr. Big took me to observe how his workers used mercury to transform a bucket of concentrated, muddy sludge into the day’s gold take. All day, his men had collected slurry that clung to the carpeted sluiceway. The heavier gold particles stuck to the carpet,

which was then carefully washed and transferred into a five-gallon bucket.

Two workers now waded together in a waist-deep pond. One added common laundry detergent to the slurry, and the other added a silver bubble of about three ounces of mercury into the bucket. His partner stirred the concoction with his bare hands in a three-foot diameter wooden conical bowl shaped much like a Chinese peasant's straw hat floating upside down in the water. The pair proceeded with a well-practiced routine: pouring the mercury-laden slurry into the conical bowl, then balletically swirling it around to rid it of the detergent bubbles and the lighter, gold-free sand.

The two men exchanged the contents of their respective vessels several times, and more gold attached itself invisibly to the quicksilver blob as if by a magnetic attraction. After a half dozen exchanges, one man carefully poured the undulating mercury blob into a 12-inch square of blue cotton cloth, and squeezed the mercury out like a farmer making cheese with cheesecloth.

At the end of the process, one man held up a nugget no bigger than a large pea, which weighed about seven grams, an amalgam of gold and mercury. Then, work finished, the men brushed their teeth in the mercury-laden water and bathed the day's grime into the same pool.

Later, Mr. Big would take the nugget to a "Toko Mas," or gold store, back in Kerang Pani, where a shopkeeper would burn off the mercury and give Mr. Big a nugget of relatively pure gold weighing approximately six grams. At 158,000 Indonesian Rupees per gram (on this day the exchange rate is about 8,800 Rupees to the dollar), the day's haul would be worth about \$105 dollars. After expenses, notably the diesel to run the pumps, which was delivered on the same iffy road loaded 200 liters on a 110 cc motorbike, each worker could count on making about \$3 to \$5 dollars on a good day; but none when it rained or the pumps broke.

Back in Kerang Pani, a village that essentially sprang up to supply services to miners, from cooking pans to prostitutes, I looked up Dr. Robertus Pamuryanto, a Javanese physician who runs a rural health clinic. He has treated miners for malaria, for sexually transmitted diseases, for TB, for Dengue fever and for being HIV positive – occupational hazards of small-scale miners around the world. Dr. Robert, as he is known, is concerned that he will soon see signs of widespread mercury poisoning – especially among the Toko Mas employees who are most directly exposed to the methyl mercury that is emitted when mercury is burned. Mercury poisoning will lead to tremors, brain damage and debilitation. "If it continues like this, we're going to see a big problem in a few years," he said.

Later, at one of the Toko Mas shops, Hadji Kadrid, 45, sat behind a counter, awaiting customers. An ill-vented "retort" that looks like a cheap plywood chimney rose from the wall behind him. There, he burns the mercury/gold amalgam with a torch, creating a highly toxic methyl mercury vapor and a piece of nearly pure gold. He places the nugget on a scale, with counterweights of miniscule dimensions, and pays cash. Kadrid tells me he's heard that breathing mercury fumes probably isn't good for him or his family, including the children flitting in and out of the shop, but he shrugs and prepares for another customer by tidying up his collection of weights.

As he picked up a pen to make some calculations, I observed a perceptible tremble in his hand.

The scale of modern gold mines is almost impossible to believe. At more than 14,000 feet in the highlands of Papua New Guinea, still in Indonesia but a world away from the small-scale miners of Galangan, the Freeport mine known as Grasberg owned by a subsidiary of New Orleans-based Freeport- McMoRan is the largest gold mine in the world, and easily the most notorious. Conceived in deception, developed amidst violence and operated through corruption and repression, Grasberg has come to represent the worst excesses of modern gold mining.

The Grasberg mine is also an amazing feat of civil engineering, allowing the company to pull massive quantities of gold and copper from a remote and challenging locale of limestone peaks with three meters of rainfall per year, landslides, earthquakes, poisonous snakes and an indigenous population of some 200 different tribes that have repeatedly rebelled against the company and its operations, only to be murderously suppressed by the Indonesian military – which has been on the Freeport McMoRan’s payroll.

Freeport McMoRan claims to be the largest taxpayer in Indonesia, but the billions that flow out of Grasberg have been the fruits of the dirtiest gold in the world, with 130 tons of waste rock produced daily for decades and dumped into rivers. Jim Bob Moffatt, the company’s director, once famously remarked that the effects of more than 40 million tons of mining waste dumped into the rivers of Irian Jaya was like “me pissing in the Arafura Sea.” (Despite repeated requests to visit the site, we were denied access.)

Large, industrial mines account for tk percent of annual world gold production. Increasingly, these mines are run by one of approximately six mining companies, mostly from the United States, Canada, Australia and South Africa.

After decades of documented abuses, the Grasberg mine was shut down for three days in early 2006 by a group of indigenous villagers wearing penis gourds and armed with bows and arrows, protesting the military’s heavy-handed and violent security measures, the lack of local benefits from the mining operations, and the environmental degradation of their lands.

The Grasberg rebellion may have marked an important turning point in the world’s – and the mining industry’s – growing awareness of the necessity to change. Even in the industry, very few will defend the toxic legacy left by past mining operations, especially the cyanide spills and acid mine drainage that mark so many of the world’s gold mines.

Today, in the Internet age, problems and abuses come to light much more quickly. As corporate responsibility consultant Zandvliet puts it, “There are no faraway places anymore.” One result is that most of the largest companies have instituted, with greater or lesser success, efforts to change the way they do business under the global microscope of international NGOs like Oxfam and Earthworks and their international “No Dirty Gold” campaign. “It’s easy to dig gold,” says Zandvliet. “The challenge is how do you deal with the people who live on top of the gold.”

Cleaning up after mining operations are completed has historically been one of the most problematic parts of gold mining operations, and

companies acknowledge that they must do much better in planning for and executing better closure plans. The Australian-based multinational mining company Rio Tinto, owner of the vast Kelian mine in Kalimantan, is one case in point. When Rio Tinto began operations in the 1970s, the company budgeted between \$2 million and \$3 million for cleanup. So far, according to Mark Hunter, the self-described “last man standing” from Rio Tinto at Kelian two years after the mine stopped production, they have spent \$138 million.

When I visited, company officials took great pains to show how they had learned lessons from past mistakes. Engineers were building vast, terraced filtration ponds and upgrading the tailings pond. They had worked with the local Dayak community to allow people to mine for gold in the area they were about to cover up with special landscaping, so nobody would come back into the tailings ponds and artificial wetlands to tear them up. “It’s become very important to us that people know that there is nothing left to take out,” Hunter said. He acknowledged that when the company began mining at Kelian, they did not include enough thought about the end of the mine. “If we could have had some closure standards in place, this would have been a helluva lot easier, with better outcomes,” says Hunter. “At the end of the day, you can’t just walk away.”

Two thorny questions remains: is it possible to mine gold, if not sustainably, at least responsibly, and make enough profit to satisfy a publicly-traded company? Even more provocatively, are there places where gold should never be mined no matter how much is there?

That second question is at the forefront of several proposed mines, including the controversial Pebble Mine proposed in Alaska.

Many people feel that one place where it should not happen is in Alaska, where the massive Pebble Mine is being proposed in the headwaters of one of the most productive salmon fishery in the world. The proposal, for North America’s largest open pit copper/gold mine, would entail creating a mine as much as two miles in diameter and as deep as the Empire State building is high to pull an estimated \$300 billion in gold, copper and molybdenum from the ground. In order to do so, the Canadian company Northern Dynasty Minerals Ltd proposes to create tailings ponds that would impede the mining waste from getting into the headwaters of the world’s largest wild salmon fishery and build three dams that would collectively be larger than the Three Gorges Dam along the Yangtze River in China.

For many environmentalists, the upcoming fight over the Pebble Mine will make the decades-long fight over drilling for oil in the Arctic National Wildlife Refuge look insignificant by comparison.

Arguably, no other mineral can lay claim to causing as much death and human suffering as gold. Oil has and continues to generate its share of conflict, but oil is a relatively recent phenomenon. Diamonds clearly have been linked to bloodshed as well, and even the thirst for coal and copper have caused untold human and ecological ruin.

But gold stands atop the heap, its very durability a metaphor for its enduring ability to make people absolutely crazy. Mark Hunter of Rio Tinto doesn't think gold's allure is all that complicated. "It's a beautiful metal that people like," he says. Still, he acknowledges that there is a fundamental problem getting it out of the ground. "Mining by its very nature," he says, "is not sustainable."

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