War, Murder, Rape... All for Your Cell Phone

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"As you crawl through the tiny hole, using your arms and fingers to scratch, there's not enough space to dig properly and you get badly grazed all over. And then, when you do finally come back out with the cassiterite, the soldiers are waiting to grab it at gunpoint. Which means you have nothing to buy food with. So we're always hungry."

That's how Muhanga Kawaya, a miner in the remote northeastern province of North Kivu in the Democratic Republic of the Congo (DRC), described his job to reporter Jonathan Miller of Britain's Channel 4 last year. Cassiterite, or tin oxide, is the most important source of the metallic element tin, and the DRC is home to fully one-third of the world's reserves. Some cassiterite miners work on sites operated directly by the country's military or other armed groups. Working in the same area are "artisanal" miners who are theoretically independent, like prospectors in America's Old West. But the cassiterite they extract is heavily taxed by the soldiers -- when it's not just stolen outright.

With a land area as vast as that of Texas, California, Montana, New Mexico, Arizona, Nevada and Colorado combined, the DRC has only 300 miles of paved roads. To reach one of the many cassiterite mines in the virtually roadless northeast, 1,000 miles from the national capital Kinshasa, Miller's team followed a 40-mile footpath that, he reported, was as "busy as a motorway. Four thousand porters ply this route carrying sacks of rock heavier than they are. Each of their 50 kilogram packs of cassiterite is worth $400 on the world market. Government soldiers often force porters at gunpoint to carry the rocks free of charge; if they're lucky, though, they can make up to $5 a day." (Watch Channel 4's gripping, award-winning report here.)

So, why should we care? Because without cassiterite rock and the other ores mined in the Congo we would be unable to manufacture the linchpins of our global "weightless economy" -- computers and telephones.

Greener phones, meaner mines

A horrific war among the DRC military and various rebel armies officially ended in 2003 after taking 3 million to 4 million lives. But fighting continued long after that in the northeast, fueled by mining profits. First-ever democratic national elections in July have set up an October runoff election in the DRC, along with great hope for the future. Meanwhile, disarmament and integration of the armies is being carried out. But soldiers frequently receive little or no pay, and that provides a strong incentive for them to squeeze what they can from the cassiterite business.

The majority of the ore moves through illicit channels across the northeastern border to Rwanda, enriching troops and middlemen along the way. The U.K.-based organization Global Witness has comprehensively documented the impact of resource extraction in the DRC in a 2005 report that described "killing, rape, torture, arbitrary arrests, intimidation, mutilation, and the destruction or

pillage of private property" that soldiers used "to gain control either over resource-rich areas or over the ability to tax resources."

Since the July elections, says Carina Tertsakian of Global Witness, "labor conditions remain pretty much the same, especially in the informal sector." She says the DRC government now has slightly more control over the mines, "but that's not necessarily for the better." Despite pressure from the United Nations and European Union to pay members of its newly integrated armed forces more consistently, miners are being treated just as they were during the war.

In a cruel irony, Western efforts to make information-age products more environmentally friendly actually boosted incentives for violence and exploitation. In late 2002, the EU joined Japan in banning lead from the solder used in cell phones and other electronic goods. Traditional solder is an amalgam of 63 percent tin and 37 percent lead, but lead-free solder is composed almost 95 percent of tin. Partly in response to that new demand, the world price of tin shot up by almost 150 percent between August 2002 and May 2004, and has remained high since. As prices rose, fighting in the eastern DRC intensified.

Killer coltan

This wasn't the first time that fighters in DRC and Rwanda have reaped a mineral bonanza. Back in 2000, a spike in the price of coltan, an ore that is the source of the precious metal tantalum, spurred feverish mining, profiteering and suffering in the same area of northeast DRC where cassiterite is mined. The DRC controls an estimated 64 to 80 percent of world coltan reserves, and the windfall from mining those deposits funded a Rwanda-backed rebel army of as many as 40,000 soldiers during 2000-2002. The mining was also blamed for destroying habitat of the mountain gorilla; the gorilla population plunged by half in a national park where coltan was being mined.

Global demand for coltan increased with the growing use of tantalum in cell phones and other electronic devices. Whereas cassiterite is needed to make the products more eco-friendly, coltan is needed to make them more compact. Capacitors made with tantalum have an unmatched ability to hold high voltages at very high temperatures. Because of that, tantalum capacitors have been essential to the miniaturization of cell phones and other handheld wireless devices. At the time of the price spike, the No. 1 destination for the DRC's coltan exports was the United States. The prices of tantalum and its coltan ore have fallen from their 2000-2002 peak, but continued heavy demand from the electronics industry will keep their value high.

Getting a signal -- halfway to the moon

There's not much tin, and only a tiny amount of tantalum, in an individual cell phone; however, explosive growth in the wireless market has piled those metals up, milligram by milligram, into countless tons. In 2005, worldwide sales of mobile phones surpassed 200 million per quarter -- that means that factories are churning out 25 phones every second, around the clock. Customers typically discard and replace their phones every 18 months in the United States, and that cycle is said to be down to 12 months in Western Europe.

In the spring of 2001, some analysts were expressing doubts over a seemingly outlandish prediction that 1.7 billion people -- one out of every four on the planet -- would be wireless subscribers by 2006. As it turned out, the planet now has more than 2 billion subscribers, and the industry would like to sell a new phone to as many as of them as possible by the end of 2007.

Two billion of those little phones laid end-to-end would reach almost halfway to the moon. And that doesn't count the vast numbers already buried in landfills or abandoned in desk drawers.

As portable electronics acquire even more innovative features and (somehow) grow even smaller, their manufacture is sure to require even more exotic materials. And, more likely than not, those materials will come from some exotic location. Even before the handheld revolution, the United States was importing more than 70 percent of its tin, nickel, platinum and chromium, and more than 90 percent of its tantalum, aluminum ore, niobium and manganese. The EU and Japan are even more dependent on imports of those minerals, as well as silver, zinc, tungsten, gold, vanadium and copper.

Battery and assault

Cell phones, laptop computers and other portable electronics rely for their power on lithium ion batteries, which aren't just made of lithium. They contain copper and cobalt (often found together in a single ore called heterogenite) as well as nickel and iron, and generally have to be replaced every one to three years. (Up to 6 million will need to be replaced all at once with the recent recall of Dell and Apple laptop batteries). The DRC has 10 percent of the world's copper reserves and 30 to 40 percent of its cobalt, and with the prospect of a stable central government, the country's importance as a source of those materials for batteries and other uses is expected to grow.

The DRC's mines are in its southernmost province, Katanga, which went largely unscathed by the war that raged far to the north. Nevertheless, artisanal miners work under conditions that are only marginally better than those in the tin and coltan mines. They crawl through incredibly hot, cramped tunnels lit only by small flashlights or candles, using only shovels or their bare hands as tools. The BBC reported last year that the Ruashi mine employs 4,000 miners, some as young as 8 years old, who "dig and sieve from dawn to dusk."

Although transnational corporations are now rushing in to exploit the heterogenite deposits on an industrial scale, much of the ore is still being extracted by artisanal miners like those in Ruashi. Global Witness explained the danger in a July 2006 report:

Deaths usually occur when miners are digging holes -- sometimes 20 meters or deeper -- then digging horizontal corridors, known as kalolo or galleries, as they follow the cobalt or copper veins. The kalolo sometimes extend over stretches of more than 50 meters ... Those who remain at the top are usually the first to spot signs of crumbling earth and try to warn their colleagues of the danger -- often too late. As the mineshaft starts collapsing, they may attempt to rescue their colleagues trapped underneath. In some cases they succeed. In other cases, they have themselves been trapped by falling rocks, injured, and even killed in the process of trying to save their teammates.

There is an expectation in Katanga that after the October elections, foreign corporations will move in, putting an end to the more dangerous freelance mining. But the highly mechanized companies will be able to employ only a small fraction of the current artisanal miners, and, says Carina Tertsakian, there are already reports of clashes between corporate security guards and miners reluctant to surrender the sites they've been working.

Scary old phones

The level of exploitation continues to be affected much more by prices on the London Metal Exchange than by international efforts to protect workers or curb illicit trafficking of resources. Tertsakian says, "Organizations and journalists have created greater awareness, but I have to say we haven't seen that awareness translated into action." Even when Western manufacturers attempt to avoid buying Congolese minerals mined under deadly and exploitative conditions, they find it's not easy.

A great amount of the tin, coltan, copper and cobalt move out of the DRC via such roundabout and shadowy routes that it becomes almost impossible for a company at the end of the line to determine their origin. And human-rights-conscious consumers are even deeper in the dark. You can't boycott the assortment of metals in an electronic device the same way you can boycott a "conflict diamond" with a clearer history.

Demand for the minerals could be slashed if customers didn't replace their cell phones as often, and if when they did buy a new one, they no longer treated the old one as disposable. A myriad of for-profit and charitable organizations are now collecting unwanted cell phones for resale, donation or recycling. (Read thelist of those who have taken a pledge of responsibility).

Yet the U.S. Geological Survey (USGS) says that currently fewer than 1 percent of retired phones in this country are restored or recycled. With word spreading, that market may increase, and begin to affect the new phone market. As the title of an article in the current issue of *Inc.* magazine shows, manufacturers are already concerned: "Three Scary Words: 'Buy It Used'."

A 2004 California law requires sellers of cell phones to accept return of the instruments by their customers for reuse or recycling. It was passed in the face of the industry's intense nationwide efforts to defeat such mandatory take-back bills. Nationally, all four top wireless companies -- Cingular, Sprint, T-Mobile and Verizon -- have voluntary take-back programs; however, a "report card" issued in April by the Washington, D.C.-based environmental group Earthworks gave those programs an F.

Of the stores Earthworks visited, only 30 percent displayed information on drop-off and recycling, and only 50 percent of company representatives provided accurate information on the program. And companies could not verify that they were handling the returned phones according to best environmental and social practices, or that they weren't simply dumping many of them overseas.

Kimberlee Dinn of Earthworks says her group has seen some modest improvements in response to the report card. "There's a little more visibility of programs in the stores, more prominent

mention on some of their websites. But not a single company has been able to provide us with statistics showing increased recycling of their phones."

To handle returned phones, all of the big four companies contract with ReCellular, Inc. of Dexter, Mich., which, according to Earthworks, is the only company to have been *removed* from the Electronics Recycler's Pledge of True Stewardship for noncompliance with its standards.

Dinn says California's mandatory recycling law has been a huge boon to ReCellular, which has grabbed 75 percent of the national market. CNN puts its market share somewhat lower, at 53 percent, and praises ReCellular for selling 55 to 60 percent of its still-functioning phones abroad, largely in poor countries where people can't afford new ones. That keeps waste out of U.S. landfills but also raises a question: If most used phones are being bought by people who would not have bought one otherwise, is reuse really cutting very deeply into demand for minerals, including those mined under conditions of near-slavery?

Tiny treasure trove

Once electronic goods go kaput (as they all eventually do), the metals they contain represent a potential "treasure trove," in the words of USGS. By their calculations, the 500 million phones now lying unused in American homes and businesses contain more than 17 million pounds of copper, 6 million ounces of silver, 600,000 ounces of gold, and 250,000 ounces of palladium.

The tin in the 110 pounds of cassiterite a hauler in Congo carries on his shoulders for 40 miles would make enough tiny drops of tin solder to manufacture tens of thousands of cell phones. The incentive to recycle that tin is boosted, of course, by the presence of precious metals lying next to it in the phone. But each device contains only a few cents' worth of any one metal, even the precious ones. And unlike aluminum cans, which are composed of a single, nearly pure metal, electronic goods don't surrender their diminutive, complex array of metals to the recycler without a struggle.

Among the charges that Earthworks levels at ReCellular has been that it ships nonusable phones to countries where hand labor for disassembly is cheap but environmental and workers' rights abuses are commonplace. Dinn says, "You hear horrible stories from Malaysia, Sudan and other countries -- no protective gear for workers handling the toxic materials in the phones, work being done by prisoners."

But Seth Heine, CEO of the phone recycling firm CollectiveGood in Tucker, Ga., says the metals in nonrepairable cell phones are well worth the costs of collection, shipping and processing, and that it can be done responsibly. Because CollectiveGood is "fixated on following absolutely the most environmentally sound procedures," Heine sends cell phones to an Antwerp, Belgium, company whose standards are "higher than anything in the U.S."

There, 17 different metals, including tin, copper, and cobalt, can be reclaimed. But says Heine, "No company's process at this point can reclaim tantalum. That's frustrating, considering its tragic history in the Congo."

On their backs

Reducing demand for coltan, cassiterite, heterogenite and other ores -- by reusing, recycling, and simply not buying so damn many electronic goods so often -- cannot by itself ensure safe jobs and living wages for people in the Congo or anywhere else. But a seemingly insatiable hunger for mineral resources can and does distort economies in some of the planet's most desperate locales. Relieving some of that distortion through reduced consumption at least gives nations and people a chance to build better lives independent of the ups and downs of world commodity exchanges.

Back in North Kivu last year, Channel 4's Jonathan Miller asked some of the people trudging along that muddy trail if they knew what the burdens they carried would be used for. He reported, "Not one of them knew their cassiterite was destined for the electronics industry in the rich world. One man claimed he knew: 'It goes to America,' he said, 'to rebuild the Twin Towers and the Pentagon.'" I don't know whether Miller told that man the real story -- that within only a year or two, much of the tin in the rocks on his shoulders, having served its purpose in the information economy, would end up lying unused in a dresser drawer or trash heap.

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