

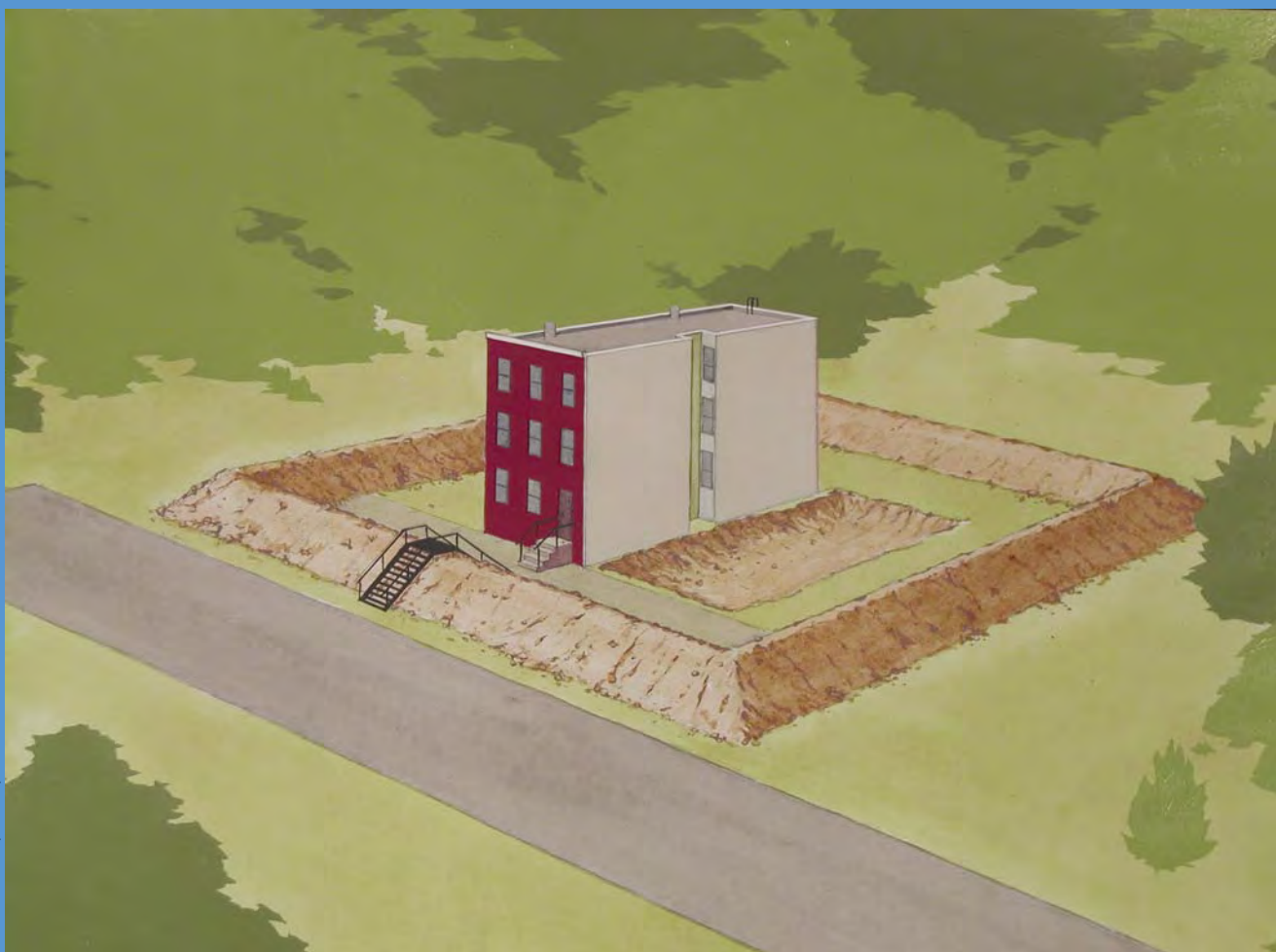
SAGE

MAGAZINE

volume II, issue II



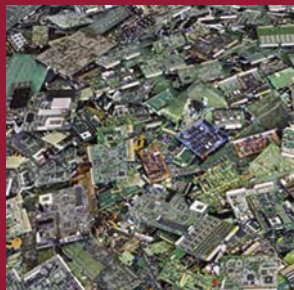
UNTITLED FLAT (WOODS) • CHRIS BALLANTYNE



Cover image by Miru Kim
Freedom Tunnel shining, 2007
Digital C-print

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Contents

Departments

- 6 **Out & Around**
- 8 **Materials** Jatropha
- 10 **Innovations** Biomimicry
- 15 **Food For Thought** Seasonal Foods
- 30 **The Cabbage** Fake News
- 32 **Listed**
- 34 **Last Page** Creating a Community

Art & Poetry

- 16 Alec Spangler
- 33 Katharine Boicourt, Mia Nussbaum

Features

- 18 **Tragedy at La Oroya** *Photo Essay*
Sonja Swift
- 22 **The Low End of High Tech** *Local and Global Dimensions of E-Waste Recycling in New Delhi*
Stefan Renckens

Short Features

- 12 **Coming Soon, to a Theater Near You . . .**
Enviro-Documentaries
Laura Jensen

Funding for **SAGE** Magazine was generously provided by the Office of the Dean of the Yale School of Forestry & Environmental Studies.

SAGE Magazine is produced by a local, unionized printer.

Please address all article queries, advertising inquiries and letters to the editors to:

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FROM THE EDITORS

Hello children!

It's lovely to see you around these parts again. Hope you've been well. A lot has happened since the last time we spoke. I'm sure we're both a little older now, a little wiser, a little bit closer to actualizing our goals and innermost desires. Also, we're banned from a few more places. And let's not forget what happened on New Year's. Actually, yes, let's forget that.

Well hey, I know we don't get to talk very much, only a couple times a year, but I just wanted to say hi, and thank you. Thank you for being you ... for being there. Out there. Y'know, I only exist because you do. Because you are there to listen to, to talk to.

SAGE is just trying to be one voice, one clear loud voice. One voice against the ceaseless howling wind. One voice, clear and loud, singing a simple song, sending out a call that will carry on the gusts to your ear. Singing so that you can hear ... so that others can hear.

And it is not my song. It is an ancient song. Our song, a song for everyone to sing. And maybe if you sing too, and you, and you, and you ...

If enough of us hear each other, and we all sing our graceful timeless song together, then maybe we can drown out the wind entirely and all there will be is music. Only countless voices, raised in unison.

Thundering.

Thank you to everyone out there doing amazing small beautiful things to make something better for all of us. Thank you to everyone contributing in some way to the great big mushy pie that is this movement.

We salute you. Keep singing.



SAGE

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Eco-City or Bust: China's Ambitious Blueprint

SIMON TUDIVER

It's an unlikely place to start an environmental revolution—huddled beneath the Shanghai smog, on an island of eroded silt in the mouth of the Yangtze River. But the Shanghai Industrial Investment Corporation is trying to do just that. The group plans to revolutionize urban design by building an eco-city to house half a million people. It will be called Dongtan, and it is being hailed as a global first—carbon-conscious, ultra-efficient—a model for China's next great environmental leap forward.

Dongtan, which literally means "east beach," will rise from the southern tip of Shanghai's Chongming Island, a 160-kilometer-long mass of agricultural land partly formed from accumulated sediments in the Yangtze River delta. The island is commonly regarded as the city's last remaining patch of tranquility in an expanding sea of concrete. Twenty years ago, much of Shanghai's land was covered in rice paddies, but breakneck development has transformed the region into a megalopolis of 130 million residents. Dongtan represents a vision of a kinder, more sustainable Shanghai—a way of preserving a measure of calm amidst the chaos.

But Dongtan is meant to be more than just pleasant; it is designed as a showcase for green building and urban planning. The city will generate all of its power from renewable sources, including a new wind farm in the mouth of the Yangtze and photovoltaic cells on the roofs of buildings. Biomass from rice husks and other agricultural waste will be converted into fuel for heating and electricity. Dongtan can rely on these relatively weak energy sources because of its drastically reduced demand: The city's buildings will be airtight,



An artist's rendition of the east village and east lake of the future city of Dongtan

well insulated and super efficient, requiring a tiny fraction of the energy used by an average Chinese building.

Energy use will also drop because of Dongtan's physical layout, which will affect the way residents move around. Public transportation works best when people live close together, so housing density is being carefully planned to optimize transit use. The first stage of development (which is expected to house 10,000 people in time for Shanghai's World Expo in 2010) will place three residential pockets around a commercial center in order to encourage walking, reduce commuting and nurture community. This layout will also minimize walking distances to transit stops, and the city's buses will run on hydrogen fuel cells. There are even hydrogen fueling stations in the works, in anticipation of a future influx of clean cars and scooters (gas-powered vehicles will be turned away at the gate—they're just so twentieth century).

The wider impetus for a project like Dongtan is not hard to guess. China's environmental footprint is already huge—and it gets bigger every year. The list of current problems hangs lower than Dickensian smog: The air in Chinese cities

is among the worst in the world, about a third of the country's waterways are heavily polluted, swamps and lakes are drying up and huge swaths of land turn to desert every year. It is the stunning growth of cities like Shanghai that is driving this destruction of the country's resources. According to the Worldwatch Institute, in 2005 "Shanghai constructed more building space than exists in all the office buildings of New York City." And the demand just keeps growing: A staggering 300 million people are expected to move into urban areas over the next 20 years, requiring four hundred new cities about the size of Memphis.

This is where Dongtan comes in, blazing a trail of low-impact development for others to follow. The British consulting firm Arup—the brains behind the design—claims that Dongtan will provide "a methodology for sustainable communities across China and beyond." It is a visionary idea, and like most visionary ideas, achieving it will take a lot of work. As ambitious as the city's design may be, actually building Dongtan is only the beginning. Beyond that lies the truly difficult task of transforming this eco-city rising from the banks of the polluted Yangtze from a radical concept to a replicable standard. ▢

Powerless in Manhattan

JOHANNES HIRN

You can spot the windows by the glow of the candlelight. On the ninth floor of a pre-war building on Manhattan's Lower Fifth Avenue, an apartment is disconnected from the power grid—no working TV, no air conditioning, no washing machine and no refrigerator. It belongs to the writer Colin Beavan, perhaps now better known to the world as No Impact Man: a New Yorker so fed up with mass consumption, he decided to try to consume as little as he could for one full year.

In addition to relinquishing appliances, the 43 year old avoids elevators, travels exclusively by bicycle, uses worms to compost his waste and buys organic food grown within 250 miles of his home. Beavan says his days as a "convenience-addicted, New York City take-out slave" are over. His new lifestyle even helped him lose 15 pounds.

Beavan went public with his plan in a New York Times Op-Ed column published in March, in which he confessed to his past consumerist behavior and vowed to try to "survive without making any net impact on the environment." Changing his life to "reflect [his] beliefs," Beavan led his wife Michelle, their two-year-old daughter Isabella and their dog Frankie into the experiment, which began in November of 2006.

Beavan says their new lifestyle makes everyone happier; no electricity or

television means more time for friends and family. "People are worried [that] in order to help the planet, they have to deprive themselves," he says, but "we found that some ways of life that are better for the planet are also better for people." For instance, he champions kneading bread and cycling in Manhattan, which he says help him relax.

Beavan is a man of contradictions, though. And not only because he couldn't bake bread without his gas oven or withstand the November cold without the neighbors' heat warming his apartment.

"A big part of our social life was to hang around in a New York coffee shop and just talk to people," Beavan says. So he forgoes the 250-mile rule when it comes to coffee and dinner at his friends' homes. "That would be kind of extreme, that would be kind of crazy!" he says.

Beavan also manages to stay plugged-in, despite cutting ties with the power grid. He has been telling the world about his adventure using a solar-powered laptop. His blog, noimpactman.typepad.com, has 6,500 subscribers and gets a few dozen comments per day. Beavan has managed to reach even more people through appearances on *Good Morning America* and *The Colbert Report*.

Asked how the whole project started, the historical non-fiction writer explains that he "wanted to figure out a way to write a book

to persuade everybody to live differently." After securing a book contract, Beavan became No Impact Man—for one year. His media savvy from his former life as a public relations consultant comes out when he delivers his catchphrase: "I was so upset with the state of the world that I realized I couldn't write history anymore."

Beavan holds a Ph.D. in electronic engineering, and he promised at the launch of his blog to research the merits of various green technologies. His book should contain some of these findings, which will hopefully satisfy readers more than his take on the environmental impacts of alternatives to toilet paper: "If we don't use it, we don't need the facts," he told Michelle.

The No Impact adventure is also being adapted for the big screen by filmmaker Laura Gabbert, a friend of Michelle's. Gabbert says Beavan was not initially enthusiastic, but she convinced him that the film's positive impact on people would outweigh the negative environmental impact of its production. The film and the book (to be distributed and printed in some yet-undetermined, eco-friendly way) should be out in 2009.

For now, with the experiment over, Beavan guarantees he is "not bringing the TV back." But what about the little temptations, like take-out food after a long day or an elevator ride to the ninth floor? Can our No Impact hero sustain his virtuous ways? ♪

JATROPHA

STELLA ZUCCHETTI SCHONS

In the last couple of years, a humble-looking tropical shrub has increasingly captured the attention of scientists and policymakers worldwide. Sometimes modestly referred to as the "miracle plant," jatropha promises to move us closer to solving two of the greatest problems facing the world: poverty and climate change.

Jatropha actually refers to a genus of 175 plants, but recent attention has been focused on a single fast-growing species, *Jatropha curcas*, which produces a seed replete with oil that can be processed into biodiesel for transportation and power generation. Moreover, the plant is remarkably resistant to harsh, dry climates and poor soil conditions—characteristics that make jatropha a "socially friendly" crop, with great potential to become a sustainable source of income for local communities in the developing world. It remains to be seen, however, whether jatropha can live up to its lofty billing.

Little is known about the exact origin of this wonder weed. Some believe it is native to Central America, while others claim it hails from further south. First taken by Portuguese navigators to their colonies in Africa and India in the sixteenth century, the plant is now widespread throughout the tropics.

Jatropha has long been put to multiple uses. As a medicinal plant, it has been used widely as a purgative, a salve for bruises and skin rashes, and a treatment for rheumatism, hemorrhoids and tumors. The shrub has also been employed as fencing for fields and farms, since toxic compounds in its leaves keep marauding ruminants and wildlife away from crops.

Over a century ago, jatropha provided an



Jatropha seeds from fruit such as these may yield two tons of oil per hectare, to be immediately used for household purposes or ultimately refined into biodiesel
Photo courtesy of jatrophaworld

important export from colonies in Africa and the tropical Americas to European capitals, where its oil was extracted for soap production. More recently, this oil has become significant to the environmental community, and not for its cleaning power. As early as the First World War, the German army discovered that the oil can be easily converted into high-quality biodiesel and put this knowledge to limited use. But with increasing debate around climate change in the last five years and the drive to find alternative sources of energy, efforts have intensified to transform the cultivation of the crop into an economically relevant activity, especially in developing countries.

Jatropha seeds contain approximately 37.5 percent non-edible oil, which can yield around two tons of oil per hectare. The extraction of this oil from the seeds can be done manually or with engine-

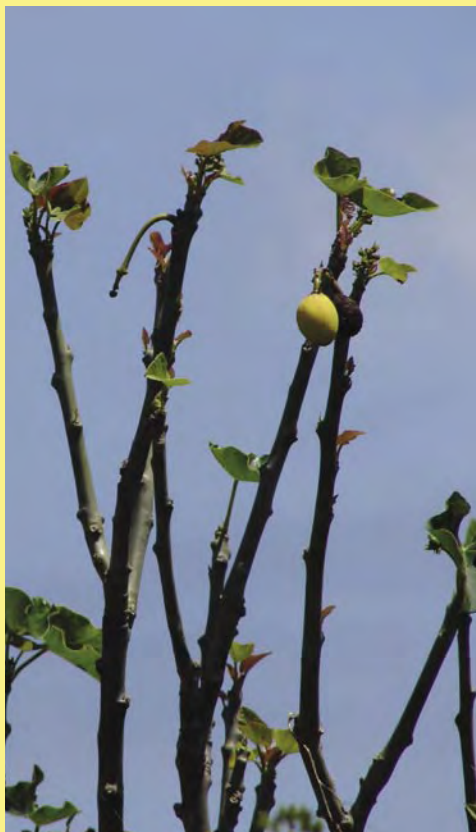
driven expellers, simple machines that can be built in almost any country and are easily operated by members of local communities. The extracted oil can be used directly for lighting, cooking or lubrication, or it can be refined into biodiesel. In recent years, a team from the Central Salt and Marine Chemicals Research Institute in Gujarat, India, working in conjunction with DaimlerChrysler, reported successful efficiency tests of the biodiesel extracted from jatropha seeds, affirming that "jatropha-based biofuel can be used without any problems in modern CDI [Mercedes Benz] engines adapted for biodiesel."

According to recent figures from Goldman Sachs released in the Wall Street Journal, jatropha can provide a fuel that is nearly 50 percent cheaper than the corn-based ethanol so intensely promoted

and subsidized in the United States. In developing countries, although comparable in price to biofuel production from sugar cane, jatropha has the potential to bring significant social benefits in addition to an alternative form of energy.

Indeed, jatropha's potential role in sustainable economic development is worthy of notice. Because it fertilizes surrounding soil, jatropha can be planted in association with other crops—a technique known as intercropping—greatly increasing the economic value of the land on which it is grown. The plant appears to naturally reduce soil erosion, benefiting adjacent agriculture and indicating jatropha's potential use in combating desertification. Its natural hardiness and ability to restore soil nutrients mean that its cultivation also requires very little water and no fertilizers or pesticides. All of these characteristics make jatropha both environmentally and economically attractive to farm.

In addition, the simple technology used to extract the oil from the seeds enables it to be produced within local communities,



Fruiting *Jatropha curcas* plant
Forest and Kim Starr



Jatropha plants growing near the sea in Maui, Hawaii
Forest and Kim Starr

eliminating middlemen and increasing the value added of the product sold by farmers. The extraction process also leaves behind a seed cake, which can be used directly as a fertilizer, a cooking fuel or a pesticide. Glycerin, another by-product of that process, is the element used for the production of soap, a livelihood seen as a promising opportunity for the inclusion of women in reaping gains from the plant's cultivation.

Despite the great potential of jatropha, a lot of uncertainty remains regarding its cultivation. There is still little knowledge about the optimal levels of water, fertilizers and land necessary to maximize oil production, and thus economic feasibility is not guaranteed. Further, comprehensive scientific research is necessary to uncover the environmental and socioeconomic impacts of widespread cultivation.

Many projects involving jatropha have been implemented in the developing world by governments, international organizations and private companies, with the most activity coming from India. Initiatives have been carried out throughout that country as it aims for energy independence by 2012, and are mainly led by state governments in

partnerships with the private sector. Farther east, the government of the Philippines has devised a national plan to become oil independent using jatropha, and BP and D1 Oils have a joint venture that will invest \$160 million over the next five years in jatropha plantations in India, Southeast Asia, southern Africa, and Central and South America. With their fingers crossed, scientists and policymakers worldwide await news of biophysical and social outcomes from these projects and others. A lot has been bet on the miracle plant, yet its potential benefits have not been fully proven.

Jatropha might be another "opportunistic weed." Its utopian promise might just be an illusion generated by people's thirst for cheap and easy sources of alternative energy—an illusion which may later fade and bring disappointment, especially given the huge potential benefits people now envision. On the other hand, jatropha may indeed help us meet our urgent need to begin tackling the causes of climate change, fitting within an array of renewable resources that, together, can provide us with a mosaic of viable energy alternatives to fossil fuels—and improve livelihoods around the world at the same time. ☐

BIOMIMICRY

EVA GLADEK

It's a crisp fall morning. Sunlight filters through the many tiers of autumn-paned leaves overhead. A spider's web, studded with dew, glitters with a passing breath of air. Yes, we revel in nature's beauty. It soothes our biophilic cravings. But peel back that layer of aesthetic balm, and we find that the framework underneath is made up of none other than kick-ass feats of . . . engineering.

Every leaf is a matrix of photovoltaic generators, capable of converting sunlight into carbon-based energy in trillionths of a second. Spiders secrete the strongest fiber known to man—their silk five times tougher than steel of the same density and 25 percent lighter than synthetic, petroleum-based polymers. Perhaps most amazingly, these naturally occurring machines and materials self-assemble, quietly, without high-pressure or high-temperature manufacturing environments, all while generating zero non-biodegradable waste.

So why are we doing things the hard way?

In her influential 1997 book, *Biomimicry: Innovation Inspired by Nature*, Janine Benyus posed this exact question. Her answer: because we're stuck in our traditional approach to design and manufacture—a crude methodology that relies on plundering natural resources and beating raw materials into the shapes of our liking with extreme physical conditions and harsh chemicals. She coined the term "biomimicry" to describe a new approach that she observed being practiced by individual scientists. Biomimicry is based on learning from natural systems and actively imitating them. One of its key goals is to take advantage of the inherent properties of naturally evolved solutions such as self-assembly, the use of ambient temperature

and pressure, dependence on abundant and largely non-toxic precursor materials, and the elimination of waste.

Since the definition of the movement ten years ago, an increasing number of innovators have begun to identify

Nature has had billions of years of evolution to develop perfect materials and solutions. As human beings, we just don't have that much time."

G3i, along with other like-minded ventures, has pointedly begun to harness the billions of years of R&D time that nature has already invested in the biosphere. One of their main



Green mussels (*Perna viridis*)
Photo courtesy of USGS and Buck Albert

themselves as "biomimics." The reasoning behind this shift is as financially and technologically sound as it is green. Alex Qiao, president of technology company G3 Technology Innovations (G3i) points out, "Any technology you can name, Mother Nature does it a lot better than we can.

products is GreenShield®, a water- and stain-repellant fabric finish that imitates the surface structure of lotus leaves. The tiny nano-bumps naturally present on the surface of the leaves increase water's tendency to form droplets. The water rolls off, taking grime with it, and presto—clean and dry.

Qiao's team was particularly interested in tackling the problem of stain repellents because they saw the potential to address a hotly debated public health issue. The key ingredients in the vast majority of our existing stain-resistant coatings and non-stick cookware are fluorochemicals. In the tradition of "better living through chemistry," these materials have undoubtedly made certain aspects of our lives easier—think of cooking pre-Teflon or camping before Gore-tex. The flipside is that many of these compounds are also environmentally persistent and bio-accumulative. Studies show that trace amounts are detectable in the blood of 90 percent of Americans. Though there isn't yet conclusive evidence of their negative effects on human health, there have been some worrying preliminary animal studies. As a result, the EPA has asked the fluorochemical industry to make a concerted effort to phase out certain of these compounds by 2015.

"The product we designed that takes the lotus leaf as a principle allows us to reduce these chemicals to a level that is so small that it's no longer an environmental concern," says Qiao, adding that they're currently working on entirely eliminating fluorochemicals from their coating material. In copying the natural structure of the lotus leaf, Qiao says, they can maintain the same functionality, achieve a low manufacturing cost and still avoid contributing to the volume of synthetic chemicals floating around our biosphere.

Though it has a flashy new name, biomimicry as a practice is by no means new—anyone who has seen Leonardo da Vinci's sketches or read about the development of the airplane can attest to that. In Qiao's opinion, what is significant about this latest biomimetic wave is that researchers now have access to the nano-scale of design. Just as in the case of the "lotus effect," many of the most enviable properties of natural materials originate at this smaller scale of design.

Take, for example, the notoriously shatterproof abalone shell. Mother of pearl, the iridescent stuff the shells are made of, is

actually over 90 percent the same material as chalk. The trick behind its strength is all in how it's arranged on the nano-scale. Tiny tiles of the chalk material are laid out in alternating rows stacked like bricks with sticky proteins in between. Because of its structure alone, mother of pearl is 3,000 times stronger than the mineral it's made of—and has become the inspiration for a host of new materials from room-temperature-manufactured ceramics to body armor.



Photo courtesy of PDPhoto.org

Examples of this kind are countless and diverse. Brilliantly colored peacock feathers achieve the effect without using any pigments—their nanostructure interferes with light patterns to reflect the resulting spectrum of colors. Generating color without chemical pigments would cut huge volumes of toxic wastes from our industries. Mussels are excellent at sticking to rocks, but even better, the "superglue" they generate is non-toxic and works underwater. Certain microbes "mine" small amounts of metal from wastewater. Who knows? We may eventually be able to use microbes to recover trace amounts of metal

from our wastewater systems instead of mining virgin material.

In entering this biomimetic "nanoworld," however, there's an onus placed on innovators on the cutting edge to move beyond the impulse to simply rip off the end product of natural designs and actually include the features of natural manufacturing as part of the goal. It's easy to see how present-day industrial manufacturing techniques could be used to make products inspired by nature. Airplanes are based on flying animals, but we haven't, for obvious reasons, tried to build them the way animals get built. With larger-scale examples of biomimicry, resorting to business as usual in the manufacturing process is understandable.

On the smaller scale of design, there are more possibilities to stay true to the construction method of the natural system being copied. The goal now will be to avoid the urge to abandon manufacturing methods that use lower temperatures or simpler precursor materials just because they may be slightly less efficient than our conventional way of doing things. Qiao says that his team made special efforts to develop a manufacturing process for GreenShield® that would be "green" from start to finish with the overall goal of doing "more with less." But this is a conscious commitment that will need to be kept, starting with scientists and engineers and continuing all the way up to the company heads calling the shots on how large-scale manufacturing gets done.

With the current push for green innovation to lead the way in resolving some of our global sustainability issues, biomimicry offers a way forward. If we look hard enough, we can find ideas for solutions to most of the technological problems we grapple with as a species—from energy and water supply, to navigation and camouflage, to packaging and glue. Whatever we're looking for, it's probably out there. So to all those scientists bored at their lab benches and in need of inspiration: Maybe it's time to get out of the lab and take a nice stroll in the woods. ☿

Coming Soon, To A Theater Near You . . .

Environmental documentaries are becoming a modern form of social mythology—with an increasingly large budget. Does this type of environmental media change the way in which we expect to be informed about environmental issues?

Laura Jensen

The movement

Recycling bins have never been so full. Energy efficient light bulbs have never been in such high demand. The Toyota Prius has never been so trendy. Never before have climatic changes been such a popular topic of discussion at the cocktail parties of the rich and famous.

Green, they say, is the new black.

The environment has gone from being the concern of a largely depressed but committed subpopulation of tree-sitting, granola-crunching idealists (or so we were stereotyped) to the topic du jour at water coolers around the nation. Like an overweight brainiac suddenly being crowned the prom queen, environmentalism has stepped into the limelight to accept its new role, embracing its public image with aplomb. With the success of Al Gore's thrill-a-minute documentary (never has a graph-heavy PowerPoint presentation been so frightening), the environmental movement has found an effective way to rally the masses: by using famous people to scare the shit out of them.

The mythology

Environmental documentaries differ from their more demure docu-colleagues that

merely inform the viewer about topics: They seek to spark action that will prevent the denouement of *Life As We Know It*. These films deploy "social myth," a type of mythological story laden with values and lessons, espousing tips on how to interact with the world around us. Although these tales do not feature the gods and goddesses of Greek and Roman mythology, the anthropomorphized ravens, snakes and wolves of Native American, Australian and African creation stories, or the many-armed deities of Hinduism, their intent is much the same. Environmental documentaries help perpetuate a story of global concern and import, portraying environmental decline as a unifying human condition.

Climate change, global warming, climate crisis, Super Deadly Weather Disaster II—the impending apocalypse by any other name would smell so sweet. Gore's *An Inconvenient Truth* and the smaller-budget *Everything's Cool*, a 2007 flick that tells the story of those telling the story about global warming, exemplify the use of social myth in creating climate change narratives. In these films, global warming is the issue of our lives, of this century, in the world, and perhaps ever to confront humanity. Although not always felt or seen,

it reaches all corners of the globe and everyone has a stake in cooling things down.

Following in the time-honored steps of myths through the ages, these documentaries draw on plot and characters to prescribe appropriate behavior. After looking at Gore's escalating graphs, perhaps you start to think about your car and what part it plays on that exponential growth curve. Just in time, the film offers up suggestions about what you can do: ride a bike, change a lightbulb, buy a hybrid. As with traditional myths, these stories are told and then retold—their applicability vast. Within the past couple years, climate change has percolated into the public consciousness and is now often used as a trump card—thrown down with vigor to explain, for instance, late-season freezes or disappearing honeybees. The concept of global warming—the story and the idea of it—has become embedded

in our society. Global warming has acquired its own mythology: It offers explanations for events that alone would be too large or grave to comprehend (e.g., Hurricane Katrina, small island nations being



The artist formerly known as Al Gore

inundated by the sea, deadly heat waves), helping us to satiate our very human desire to understand why.

Adam Wolfensohn, producer of *Everything's Cool*, aptly points out that the story of climate change is one that cannot be conclusively felt by most individuals. Unless we happen to be living in the path of a hurricane or on the edges of the melting arctic tundra, most of us only come to know the devastating potential of global warming through exposure to the stories of others—hence the advent of global warming on the big screen. Using profiles of compelling characters and well-timed comedic relief, Wolfensohn creates cinematic micro-narratives—localized stories to which viewers can easily relate.

Through these techniques, the distance between the audience and the effects of climate change is diminished, the issue's immediacy heightened and its impacts made more tangible. In traditional myths, these same strategies—engaging personalities, humorous injections—are employed to augment the ability of people to buy into the story. Perhaps most importantly, however, these myths need a larger-than-life hero.

Fringe extremists, hippies, tree huggers, leftist whores:

Environmentalists have been called many names, most not terribly flattering. Within the context of environmental documentaries, however, greens are most aptly labeled heroes. Joseph Campbell's classic work *The Hero with a Thousand Faces* portrays traditional mythic hero-figures

as they that quest only to return home to espouse a newfound knowledge, to enlighten the laypeople. Having survived an adventure that propelled them beyond the realm of the average human, heroes

role. We, environmentalists, have quested: We have sought out and sorted through the sometimes disgusting, frequently disheartening, and often daunting information on the issues that plague our planet. We have battled: We have refused steak for the sake of the planet, we have driven around red counties in our hybrid cars decorated with liberal bumper stickers, we have written Letters to the Editor that no one reads. With these documentaries, some of us are permitted to fulfill our destinies as soothsayers, as wisepeople prepared to disseminate our myth—our epic story—widely. The most notable, the most courageous, the most... famous? environmentalist here becomes a hero.

The movie

Leonardo DiCaprio's film *The 11th Hour*, released in theaters over Labor Day weekend by Warner Independent Pictures, saw *An Inconvenient Truth*'s ex-VP and raised it one super-famous mega-star. DiCaprio has played a hero many times; *The 11th Hour* gave him a chance to be a hero by narrating a big screen flick about the environment.

According to Leila Petersen of Tree Media, one of the film's producers, *The 11th Hour* has an aim much broader than simply educating the masses about global warming. This film seeks to answer the question of why humans aren't more proactively working to counter climate change, digging at what she sees as an even bigger problem than a warming planet: the broken bio-feedback loops

Like an overweight brainiac suddenly being crowned the prom queen, environmentalism has stepped into the limelight to accept its new role, embracing its public image with aplomb.

share their insight hoping to create a greater awareness within society. The myriad environmentalists featured in recent documentaries effectively fill this

between people and their environment. *The 11th Hour* is both an effort to get people to think about the human/environment disconnect and, says Petersen, a way to "seed media with positive and beautiful

work." Petersen envisions the environment as a unifying topic and believes that solving environmental crises solves a lot of other problems related to the quality of human existence. Her comments make clear the

more targeted outreach. These localized endeavors, he claims, have a significant advantage in conveying their message: a familiarity with the target audience and the flexibility to change tactics when

Does every cause now need a celebrity, a soundtrack and glossy packaging to make it appealing?

universality of the film's content and its quest to change human behavior, essential qualities of social myths. DiCaprio's involvement in the film brings it the myth's larger-than-life hero.

In addition to DiCaprio's narration, the film features a lineup of over 70 experts speaking on topics ranging from water resources and sustainable design to religious perspectives on environmental issues. Paired with DiCaprio's famous mug, the slickness of the documentary's production—an interactive website, a debut at Cannes, a contract with Warner Brothers, oh my!—sets the film apart from its predecessors. Unfortunately, all this was not enough to keep the film in theaters long enough for me to see it. Despite *The 11th Hour's* haute couture cast, production and marketing, this environmental epic bombed at the box office.

The market

Have mainstreamed environmental documentaries set a new bar for environmental communication? Does every cause now need a celebrity, a soundtrack and glossy packaging to make it appealing? If *The 11th Hour* is setting a new precedent for environmental media by wielding the appeal of a mega-celebrity (we love you, Leo!!) and top-notch production, what comes next?

Kirk Brown, president of the San Francisco-based environmental communications shop Resource Media, believes that big screen documentaries are effective, but do not supersede the efforts of local groups and

the target audience is not responding as desired. Where DiCaprio couldn't do much to appease the critics that panned his film, a smaller NGO can be more responsive, offering, for example, interactive fieldtrips to those that can't sit still through a movie. Wolfensohn echoes Brown's sentiments, saying that these large-scale attempts to spread the word might be upping the ante with respect to how the narrative is created, but do not overshadow less sophisticated means of production. Traditional environmental media—newsletters, fliers and email listservs—reach an even wider audience, he believes.



Leo
Photo courtesy of David Shankbone

As Petersen notes, the ability to reach people that are already deluged with and distracted by more and more low-

level narratives is incredibly important in our media-driven culture. Effectively communicating a message requires a multi-pronged media strategy because different things speak to different people. *The 11th Hour's* message is available as a movie, a soundtrack, a DVD, YouTube clips, a MySpace page and an interactive website designed to spark action (www.11thhouraction.com).

While fancy documentaries might not be replacing typical grassroots environmental media, they do seem to be filling an open niche. The ease with which information can be consumed by those that might otherwise dismiss it (or hide from it) seems to bolster the environmental message by making it epic, mythic and really, really good-looking. The recent decision by the Nobel Foundation to award the Nobel Peace Prize to Al Gore for his "efforts to build up and *disseminate* greater knowledge about man-made climate change" (my emphasis) underscores the power and necessity of environmental mass media. Surely, Gore's work would not be nearly as prize-worthy without *An Inconvenient Truth*. Who, after all, even remembers Gore's book, *Earth in the Balance*? With his movie, however, Gore was able to talk to a much wider audience.

And while *The 11th Hour* may not have lasted long in theaters, the many threads of media used, as well as the film's association with DiCaprio, likely reached and will continue to reach far more people than a black-and-white newsletter from Your Local Environmental Organization. Although high-budget environmental documentaries might be the kick in the pants that some people need to sit up and take notice of the state of the Earth, their investment in the environment might be severely challenged as soon as a commitment to the cause requires more than installing compact fluorescent light bulbs—say, as soon as viewers are asked to vote in a gas tax. It remains to be seen if an environmental ethic provoked by cinema has staying power to last through the arduous trials to come, or if green will soon fade and we will be back to black. ♣

'Tis the Season?

MICHA RAHDER

The produce manager laughed at my scowl, asking, "Is it the \$5.50?"

"How could a pint of blueberries possibly cost that much?"

I replied, "I know it's a lot, but they're the last of the season."

I grumpily accepted this explanation and pushed my cart along, blueberry-free. I couldn't justify paying so much, but the memory of the perfect berries I had eaten the week before still taunted me. Why did they have to end? I was face to face with the painful reality of seasonal foods.

Environmentally-conscious consumers are by now well aware of the politics of food, and most are probably firmly encamped in the debate of organic versus local, a battle waged between those who seek to avoid chemicals in their food and those who pay more attention to the chemicals being added to the atmosphere during long-distance shipping. Adding seasonal to the mix is likely to send the less committed running for the blueberry hills. For the most part, eating foods in season makes the most sense when also buying from local producers. There are exceptions—such as seafood, which cannot possibly be local in the many states without direct access to the sea—but part of the benefit of seasonal food is simply getting the freshest, most flavorful food possible. And the less time between when a tomato pops off the vine and when it enters your mouth, the better it's going to taste.

It is only in modern times that we have had the luxury of divorcing ourselves from these natural cycles. All over the world and throughout history, small-scale farmers have had to grow their crops according to the seasons simply to survive, and of course the food market for consumers followed. These annual rhythms of life have been organized and codified for at least a thousand years. In tenth century Spain, Muslim scholars laid out a detailed seasonal agricultural plan in the *Calendar of Cordoba*, a twelve-month guide that included everything from constellation movements to soil fertilization techniques to the health benefits of eating certain meats and veggies at certain times of year. Not only did the calendar provide farmers with a detailed plan for the timing of their crops, it also linked yearly production patterns with market demand by integrating seasons, food and health in the minds of consumers.

You won't see anything like the *Calendar of Cordoba* hanging in the average American kitchen, but most people are probably already buying their fruits and veggies at least partially based on what's in season. And when you start to add up the environmental and economic benefits, it's not hard to see why seasonal foods are a great choice. Buying local, in-season produce reduces the distance your food has to travel before reaching your plate, cutting down on expensive and polluting shipping. Instead of paying a premium for foods that

are rare or have moved halfway around the globe, seasonal foods are cheaper—the cost cut by both lower transport expenses and local abundance. And while you're saving money by buying fresher, more carbon-neutral foods, you're also contributing to the local economy, putting money directly into the pockets of local farmers. Finally, when foods are harvested and eaten at the peak of their natural season, they are also likely to be more nutritious.

The only hard thing about choosing foods in season is dealing with the inevitable moment when the season ends. I spend so much of the year dreaming about the return of peaches that when they finally show up in local farmers' markets, juicy flesh practically bursting through their soft fuzzy skins, I make myself sick by eating so many. Late this summer I took a trip with some friends out to a local orchard to pick apples, and we discovered some late-season peaches still hanging on the trees.

As I walked along, putting as many peaches directly into my mouth as I was putting into my bag, I contemplated the easiest motivation for eating foods in season. Yes, these peaches were putting money back into the local economy, they were reducing the number of CO₂-spewing trucks that snake across this country and they were cheaper for me as well. But more important than any of those reasons, they were delicious. ♪



Joshua Berman

ARTIST'S PORTFOLIO

ALEC SPANGLER



RUN OFF, 2007

OIL AND ACRYLIC ON CANVAS, 39 1/2 x 39 1/2 INCHES

ALEC SPANGLER USES MEMORY AND DAYDREAMS AS MATERIAL FOR VIRTUAL ENVIRONMENTS. HIS PAINTINGS AND DRAWINGS RECONFIGURE LANDSCAPE AND ARCHITECTURE ACCORDING TO IMAGINED OR MISREMEMBERED RULES OF USE-VALUE, SYMBOLISM AND PHYSICS. WHILE ROOTED IN HIS PERSONAL RELATIONSHIP TO PLACE, SPANGLER'S IMAGERY ALSO EXPLORES A RANGE OF POSSIBILITIES FOR ECOLOGICAL STEWARDSHIP AND URBAN PLANNING. HE PROPOSES A RECUPERATION OF MYSTERY AND SUBLIMITY—INCREASINGLY LESS AVAILABLE FROM WILDERNESS—THROUGH THE INEVITABLE MINGLING OF NATURE AND CULTURE.

ALEC'S INTEREST IN EXPERIENTIAL SPACE HAS LED HIM TO EXPLORE THE FIELD OF LANDSCAPE ARCHITECTURE, INCLUDING IN A SIX-WEEK COURSE AT HARVARD UNIVERSITY'S GRADUATE SCHOOL OF DESIGN IN THE SUMMER OF 2007. SINCE RETURNING TO THE STUDIO IN THE FALL, HE HAS DRAWN UPON THE ELEGANCE AND CLARITY OF ARCHITECTURAL RENDERING TECHNIQUES TO ESTABLISH A MORE DIRECT AND RELEVANT CONNECTION BETWEEN HIS CONTENT AND IMAGERY. BY CONTINUING TO INCORPORATE OTHER MORE INTUITIVE WORKING METHODS, SPANGLER HOPES TO EVOKE, WITH AS MUCH WEIGHT, THAT WHICH IS DESIGNED, IMAGINED, REMEMBERED, FEARED AND HOPED FOR. ✦



THE FALL, 2006

OIL AND ACRYLIC ON CANVAS, 35 x 45 INCHES



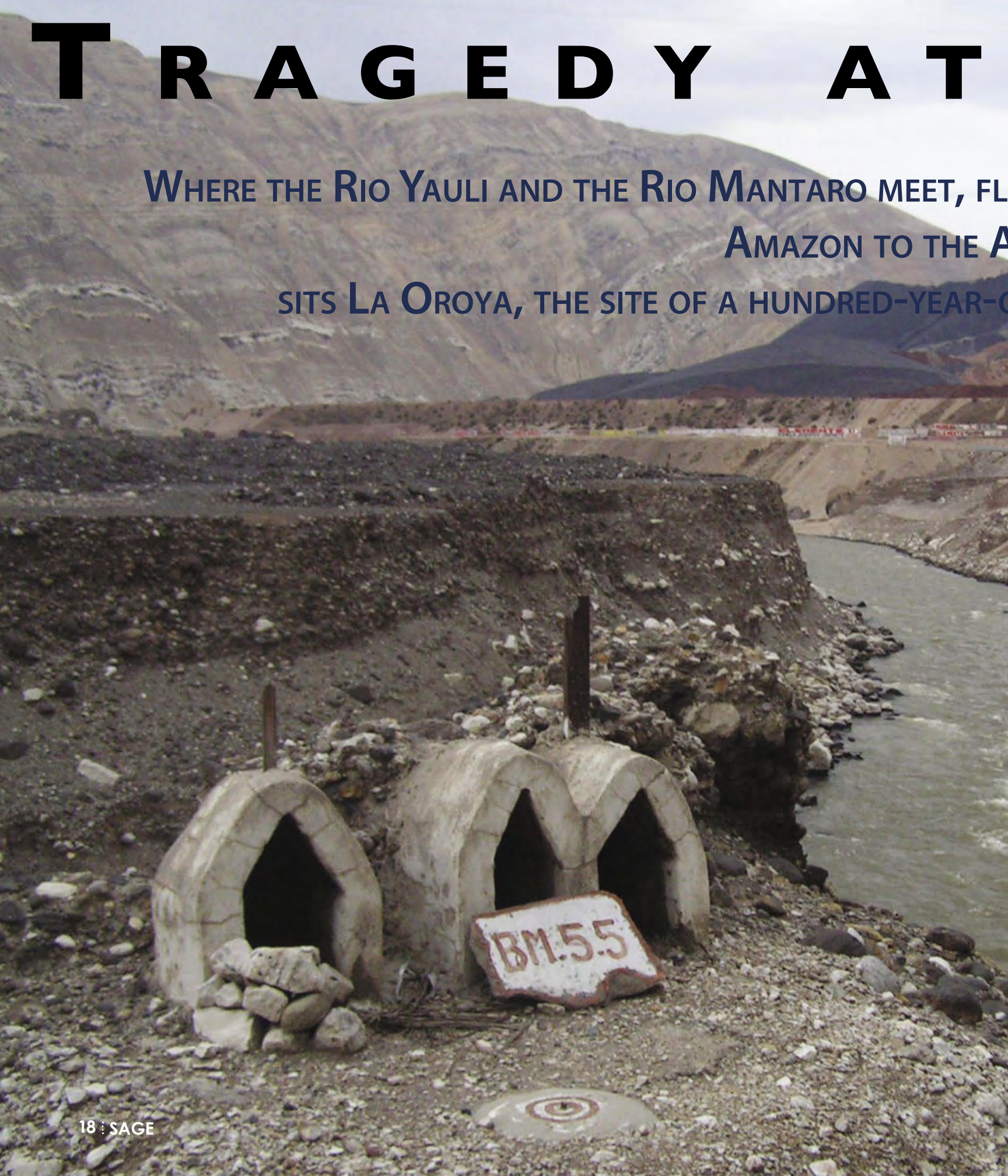
TRACKPAD, 2007
OIL AND ACRYLIC ON CANVAS, 48 x 78 INCHES



ROAD RULES, 2007
OIL ON CANVAS, 39 x 49 INCHES

TRAGEDY AT

WHERE THE RIO YAULI AND THE RIO MANTARO MEET, FL
AMAZON TO THE A
SITS LA OROYA, THE SITE OF A HUNDRED-YEAR-O



LA OROYA

SONJA SWIFT

FLOWING DOWN THROUGH THE
ATLANTIC OCEAN FAR BELOW
OLD METAL SMELTING PLANT.

LIKE THE BREATH OF A DYING DRAGON, TOXIC CHEMICALS FUME ALL DAY AND ALL NIGHT IN THIS SMALL, STRICKEN TOWN HIGH IN THE CREST OF THE PERUVIAN ANDES. THE STORY OF LA OROYA, CITED BY THE BLACKSMITH INSTITUTE AS ONE OF THE WORLD'S TEN MOST POLLUTED PLACES, SERVES AS VIVID EVIDENCE THAT, IN OUR WORLD, DIRTY BUSINESS PERSISTS BECAUSE IT PAYS, GENERATING ENORMOUS PROFITS THAT ARE DESTINED FOR THE POCKETS OF BUT A FEW.

DOE RUN, THE WORLD'S LARGEST INTEGRATED LEAD PRODUCER, TOOK OVER THE SMELTER IN 1997 AND SINCE THAT TIME HAS AVOIDED ALL ENVIRONMENTAL REGULATION ON ITS OPERATIONS. THEY HAVE RECEIVED FIVE EXTENSIONS ON COMPLYING WITH STANDARD RESTRICTIONS AND HAVE NONETHELESS FAILED TO MEET THEIR INITIAL TEN-YEAR CLEAN-UP AGREEMENT WITH THE PERUVIAN GOVERNMENT, ALL THE WHILE INCREASING PRODUCTION DRASTICALLY AND REAPING HUGE FINANCIAL GAIN. LOCAL ACTIVISTS WHO HAVE BEEN VOCAL IN DEMANDING THAT DOE RUN COMPLY WITH THE ENVIRONMENTAL MITIGATION PLAN ARE DEEMED "TRAITORS" BY MANY OF THE 4,000 FAMILIES THAT RELY ON THE FACILITY FOR THEIR LIVELIHOODS.

CHILDREN HERE LEAVE THE WOMB WITH LEAD POISONING, THEIR BLOOD LEVELS UP TO THREE TIMES GREATER THAN CONCENTRATIONS CONSIDERED DANGEROUS BY THE WORLD HEALTH ORGANIZATION. DOE RUN HAS BLAMED THIS HEALTH DISGRACE ON CAR EXHAUST, AND THE VICE PRESIDENT OF ENVIRONMENTAL AFFAIRS TOOK AN EVEN MORE EMBARRASSING LINE, CLAIMING THAT LEAD LEVELS CAME FROM BABIES SUCKING ON THEIR MOTHERS' DYED HAIR. IT HAS BEEN CERTIFIED BY

INTERNATIONAL NGOs THAT 99.7 PERCENT OF THE CONTAMINATION IS THE RESPONSIBILITY OF THE SMELTER, LEAVING 0.3 PERCENT TO BLAME ON VEHICLE USE.

THOUGH THE WELL-PAID SPIN ARTISTS SAY OTHERWISE, SWEEPING THE STREETS OR WASHING YOUR HANDS WILL NOT BEGIN TO ADDRESS THE INCESSANT CONTAMINATION SPRINKLED ACROSS FOOD CROPS, SCHOOL DESKS, DOORKNOBS—EVERY STREET CORNER, WINDOWSILL, NOOK AND CREVICE IN LA OROYA. PLANTS DO NOT SURVIVE HERE. ELDERS REMEMBER GREEN HILLSIDES AND PASTURES WHERE TODAY THE EARTH IS BARREN AND LIFELESS. NEIGHBORING VILLAGES HAVE FOUND HIGH LEAD LEVELS IN THEIR BLOOD AS WELL, THE LEAD CARRIED TO THEM BY THE WIND. EVEN LA CONCEPTION, A DISTANT VALLEY BELOW THAT IS ONE OF PERU'S BREADBASKETS OF AGRICULTURAL PRODUCTION, REGISTERS SERIOUS CONTAMINATION. AND RIVERS DO INDEED FLOW ALL THE WAY TO THE SEA—CARRYING THE CONTAMINANTS OF LA OROYA TO THE BORDERS OF PERU AND BEYOND.

ACID HILLS (PREVIOUS PAGE)

MOUNDS OF BLACK SLAG HEAPS, MINE TAILINGS TURNED TO DUST, SIT LIKE CHARRED SAND DUNES AWAITING A LIFT ON THE GUSTY MOUNTAIN WIND. THE GRAVES IN THE FOREGROUND ARE A REMINDER THAT, ALTHOUGH THE COMPANY HAS BEGUN TO COVER OVER THESE BLACK SOOT HILLS WITH GREEN SOD, THIS DOES NOTHING TO PREVENT THE CONTAMINANTS LYING BENEATH THE MANICURED SURFACE FROM RELENTLESSLY LEACHING INTO THE GROUNDWATER BELOW.

POISONED RIVER (BELOW)

A PALE GREEN DRAINAGE PIPE LIES LIKE A GIANT SERPENT ALONGSIDE THE MANTARO RIVER. THE BELLY OF THIS SNAKE IS FULL OF TOXIC WATER FLUSHED ACROSS MILES TO A FILTERING PLANT, A NEW ADDITION TO DOE RUN'S OPERATIONS. PREVIOUSLY ALL THEIR TAINTED WATER WASHED DIRECTLY INTO THE RIVER, A TRIBUTARY OF THE AMAZON, WHOSE BANKS ARE BLACKENED FROM THE CONTAMINATION.



John Swift



John Swift

FUMING SMELTER (ABOVE)

ROUGHLY 2,000 TONS OF LETHAL CONTAMINANTS—including ARSENIC, CADMIUM AND LEAD—ESCAPE DAILY THROUGH THE SMOKESTACK. A WHITE STAIN HAS LEFT ITS MARK ACROSS THE LAND. IT APPEARS, TO THE HOPEFUL EYE, TO BE A UNIQUE MINERAL FORMATION OR PERHAPS AN INCREDIBLE ACCUMULATION OF BIRD DROPPINGS. IN TRUTH, HOWEVER, IT IS SIMPLY THE GLARING RESULT OF YEARS OF HEAVY ACID RAIN CAUSED BY SULFUR DIOXIDE POLLUTION.

THE PROFITS OF LOSS (RIGHT)

DOE RUN'S CORPORATE OWNER, RECLUSIVE BILLIONAIRE INDUSTRIALIST IRA RENNERT, HAS BUILT THE LARGEST MANSION IN THE UNITED STATES, REPLETE WITH 29 BEDROOMS AND 40 BATHROOMS. HE LIVES BEHIND THE FAÇADE OF A GENEROUS PHILANTHROPIST, HAVING DONATED MILLIONS TO SCHOOLS ACROSS THE UNITED STATES AND ISRAEL. YET ALL THE WHILE HE HAS DENIED DOE RUN'S OBVIOUS FINANCIAL ABILITY TO MEET BASIC ENVIRONMENTAL STANDARDS AND TO ADDRESS THE TRAGIC HEALTH DISASTER IN LA OROYA.



Guy Guillet

POISONED PEOPLE (ABOVE)

ONE TO TWO IQ POINTS DISAPPEAR YEARLY FROM THE MINDS OF THESE YOUTH. SOME CHILDREN HAVE BEEN PULLED OUT OF SCHOOL BECAUSE THEY NO LONGER HAVE THE CAPACITY TO LEARN. A STUDY DONE BY THE HEALTH MINISTRY OF THE PERUVIAN GOVERNMENT FOUND 99.9 PERCENT OF THE CHILDREN TESTED HAD LEAD POISONING. THE SMELL OF COPPER AND LEAD REFINING PERMEATES THE AIR, WAFING FROM FACILITIES LOCATED HARDLY A MILE FROM THE PUBLIC SCHOOLS.



Guy Guillet

The Low End of the E-Waste Cycle

Local and Global Dimensions of E-Waste Recycling

How many pieces of electronic equipment do you have sitting around your house? Perhaps you still have that old outmoded mobile phone in your drawer, a still-functional monitor or desktop PC in your basement or attic. Don't worry, you're not the only one. It is estimated that up to 75 percent of all computers ever sold in the United States remain in storage, waiting to be thrown out. But don't be too sure that even when you do throw it out, it will end up in a local landfill or incinerator. There is a considerable chance that your electronic device will end up in India, China or Nigeria to be dumped, refurbished or recycled there. It's a cheap solution to the increasing problem posed by outdated hardware—how to reclaim the valuable materials in these devices while mitigating the human and environmental harms of the hazardous ones. And it should come as no surprise that when the waste ends up in poorer countries of the global South and is processed without the proper facilities available, adverse environmental and human health consequences are all the more likely to result.



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Of High Tech

ling in New Delhi

Stefan Renckens



It is extremely hot for early April as I make my way through India's capital New Delhi. The breeze waving through my hair as the auto-rickshaw gathers speed is a welcome change after the blazing sun of the previous several days. I am leaving the bustling center of Delhi en route to the Nehru Place market, a great place to buy refurbished second-hand computers and other electronic devices, so I'd been told. The market is located in the southern part of the city, not far from the famous Baha'i House of Worship better known among tourists as the Lotus Temple. Arriving at the market I am immediately immersed in the crowds of people jostling for a bargain. The market seethes like an anthill, with people coming and going, bringing and taking, buying and selling. The second floors of each of the three large concrete building complexes that make up the square contain nothing but computer and other electronic equipment shops. A few of these shops, with their shiny window displays, don't look all that different from stores you might find in smaller malls in Europe or the United States. The vast majority, however, have no windows or doors and their products are simply piled from floor to ceiling. In the middle of the shops, usually no bigger than a couple square meters, sit the owners on their chairs, trying to maintain some degree of order amidst the chaotic movement all around them. In the hallway in front of the shops, monitors and PC cases are also piled up, and here and there you can see people trying to repair old PCs. Outside on the sidewalk, still more people are sitting in the sun, engaged in the business of refilling ink cartridges. The Nehru Place market is not only used for selling and refurbishing used electronic equipment; the square is also an area where the formal and the informal sectors of the economy meet, the market serving as a collection point for electronic waste (or e-waste)—largely computers and mobile phones. Every piece of equipment that is no longer economical to refurbish and resell passes into the hands of individuals who make a living extracting the small quantities of valuable materials

from the hazardous ones contained in these e-devices.

New Delhi offers an excellent window into the global flows of e-waste. The second largest city in India, with a population of around 15 million, Delhi ranks second among Indian cities with respect to domestic e-waste generation—that is,

Indian Supreme Court banned the import of hazardous wastes in 1997, but bribery of customs officials and a general lack of efficient import controls combined with equally deficient export controls in exporting countries result in a continuing influx of hazardous wastes, including e-waste.



Marketplace in New Delhi
Stefan Renckens

e-waste generated in India itself. Estimates of the amount that is imported from abroad range from 40 to 70 percent; the exact figure, however, is unknown. The

Most of the e-waste that is recycled in Delhi ends up in the informal sector. The city is notorious for being involved in some

In the middle of the shops sit the owners on their chairs, trying to maintain some degree of order amidst the chaotic movement all around them.

of the most hazardous e-waste recycling processes in the country. These include open burning of wires and circuit boards to recover copper, the recycling of cathode ray tube (CRT) glass from monitors containing



mercury and lead, and the use of acid baths to recover gold from circuit boards. Indeed, e-waste recycling is all about separating the "goods"—copper, gold, silver, and also glass and plastic that can be resold—from the

"bads"—mercury, lead, cadmium, zinc, chromium and antimony, to name just a few. It is the members of this latter category which, when recycled in an inappropriate way, can cause serious damage to human health and the environment. Some of these effects include respiratory problems and heavy irritation of the skin and eyes, as well as water and soil pollution when parts that are unusable are dumped in a landfill or near rivers.

One of the most striking features of the neighborhoods of Delhi where the recycling, refurbishment and resale of e-waste is taking place is the structure within the chaos; there's a clear spatial differentiation of labor coinciding with socio-economic divisions. The less dangerous activities are situated closer to the center of Delhi, while the most dangerous ones are situated at the outskirts of the city. The more dangerous the activity, the poorer the people that are involved, the more populated the areas where they take place and the more Muslims and lower caste Hindus involved.

Heading north from the Nehru Place market and the Lotus Temple into the northern part of the city, I arrive at another market, but this time of a wholly different type. The Lajpat Rai market in Old Delhi lies across the street from another, and probably the most famous, tourist attraction in the city: the Lal Qil'ah or Red Fort, a former Mughal emperor's palace. This open-air market is composed of several hundred little shacks, each one again no larger than the proverbial "shoebox" and certainly not as nice as even the most humble shops at Nehru Place. Here, each shack is stuffed with all kinds of electronic equipment and parts of e-devices: CRTs, wires, speakers, chargers, old telephones, motherboards, and many other parts of various sizes whose original function I can no longer discern. To an inexperienced eye like mine,

everyone appears to be selling the same things. Some just present their products on the side of the little streets in between the various "shops." CD and DVD players are re-assembled on the spot. You can see the CD spinning in its case, while the young entrepreneur tries to connect the correct wires. Even after the Nehru Place market, walking in the narrow streets of this market bustling with people and the constant movement of boxes of newly arrived e-parts is an intense experience. And I marvel as I exit the market at the tourists entering the Red Fort, largely oblivious to the business being transacted so close by.

The areas where the most dangerous and polluting recycling activities take place are situated at the outskirts of the city: in the west in the Mayapuri area and in the north-east in Mandoli, Seelampur and Sashtri Park. It is here that the cable stripping, the smashing and recycling of CRT glass and the recovery of lead, copper, gold and silver from the circuit boards takes place. These are places where no tourist ever comes. And the people working there prefer it that way. As the e-waste issue has received more attention of late, the recyclers have become increasingly aware that they are involved in an activity that is both illegal and unsafe for their own health and the environment. They are on their guard for any person that does not belong there. All the people I talked to before going to these areas advised me not to try to take any pictures openly, as I would be met with hostile reactions. And although people were not aggressive at all, they shied away when I approached, and maintained a "mind-your-own-business" attitude. Ultimately I left, feeling disheartened by the forces that had driven these people into such a desperate occupation.

More than a million people are estimated to work in the informal waste sector in Delhi, of which more than 10,000 are involved in e-waste recycling. And there are good economic reasons for poor people

A mobile phone is already declared dead these days after an average of 18 months.

to participate in the dirty recycling of this waste. The daily earnings of e-waste recyclers in Delhi can be three to four times higher than the average worker's wage in other recycling operations in the city. Yet there is something perverse about the economics. As the Basel Action Network (BAN), a Seattle-based network of international activists, and the San Jose-based Silicon Valley Toxics Coalition (SVTC) claim in their reports, exporting e-waste to countries like India "leaves the poorer peoples of the world with an untenable choice between poverty and poison—a choice that nobody should have to make." This choice is even more disturbing when it involves children, who have been widely incorporated into the e-waste recycling sector in cities like New Delhi. Satish Sinha, chief coordinator of Toxics Link, the main Indian NGO working on the topic of e-waste, affirmed this link to economics and livelihood opportunities when I interviewed him in his office in Southern Delhi: "Recycling is a face of urban poverty."

The export of e-waste to developing countries is one of the dirty secrets of our high-tech age, making the local issue of waste generation and processing a problem with global dimensions. The waste is shipped from OECD (Organization for Economic Co-operation and Development) countries either illegally, or under the heading of labels such as "recycling" or "reuse," thereby circumventing international conventions such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Even when you donate items to an organization that sends them to poorer countries in the framework of a project to "close the digital gap," this is not without harm. After all, these devices will become waste there after a few years anyway. And for those countries that do not have the technologies available to safely and cleanly recycle or process this equipment, these

donations can create an extra burden on their shoulders—and one less for us.

A Global Problem

In a world that is becoming increasingly interconnected by

the use of information and communication technology (ICT), the quantity of electronic hardware is growing fast. It is estimated that in 2006, around 700 million computers were in use worldwide. In 2006 alone, 230 million computers were sold on the planet, with this number expected to rise to 255 million in 2007. The average lifespan of a computer, however, has shrunk to only two years. The same trend applies to mobile phones. By 2008, it is expected that there will be more than two billion mobile phone users; however, a mobile phone is already declared dead these days after an average



TV recycling in New Delhi
Stefan Renckens

of 18 months. This high rate of obsolescence has become routine for us children of the internet and high tech communication age, who have proven willing to spend big bucks on the latest flashy mobile phone or other electronic gadgets on the market. And e-waste generation is not merely confined to the richer parts of the world. Although still far behind the OECD countries in absolute numbers, many upcoming markets, especially in Asia, are amongst the fastest-growing ICT hardware users. Already now, this domestically produced e-waste is causing serious problems, ending up in the informal recycling sector and adding to the problems already caused by waste importation.

At the same time as consumption is skyrocketing, many states in the United States are starting to ban e-waste from their landfills and incinerators. This is not surprising given that 40 percent of the lead and more than 70 percent of the heavy metals found in U.S. landfills come from e-waste. The U.S. Environmental Protection Agency (EPA) estimates that 87.5 percent or more than 2.3 million tons of the 2.63 million tons of e-waste that were generated in the United States in 2005 ended up in landfills and incinerators. This means that only 12.5 percent was collected for recycling, the large majority of which is estimated to have been exported. And recycling e-devices is difficult and labor-intensive and requires expensive up-to-date technologies. This remains a serious challenge even in the more affluent countries of the OECD, where more stringent environmental laws make e-waste recycling a costly endeavor.

Cost-Effective Yet Unequal

Jim Puckett of BAN calls e-waste trade the "effluent of the affluent" and "a fallacy of free trade and globalization." In 2002, BAN and SVTC attracted worldwide attention with their report and accompanying documentary

Exporting Harm covering e-waste exports to China and to a lesser extent also India and Pakistan. They reported on the large amounts of e-waste that enter these countries every day and on the health

be impeccable, but it is very harmful nonetheless.

One of the bigger problems is that nobody knows for sure how much e-waste is traded internationally, as much of it happens in



A worker uses acid to extract gold from computer chips in Guiyu, China
© Basel Action Network 2007

and environmental consequences for the poor people that are involved in the dirty recycling. The reason for these exports is clear, according to Puckett: It's brutal economics. As chief economist of the World Bank in the early 1990s, Lawrence Summers concurred, citing the "impeccable" economic logic of exporting hazardous waste to developing countries. Recycling costs in China and in many other poor importing countries can be as low as one-tenth the cost in the United States, often totaling no more than a few dollars. This is largely because labor is abundant and cheap and environmental and labor standards are low and barely monitored. Yes, the economic logic might

the grey zones of the law. And the EPA is not sanguine about the possibility of ascertaining this information. When Elizabeth Grossman, author of the book *High Tech Trash*, queried the EPA for data on the volume of the e-waste trade, she was informed: "I don't think this is something anybody on the planet can do for you." Various sources indicate that the rich OECD countries in particular—including the United States, the United Kingdom, Japan, Belgium, the Netherlands, France, Germany, Canada, Australia, Norway, Finland, South-Korea and Israel—are engaged in exporting their e-waste. Of these, the United States is probably the worst. One source estimates that 50 to 80 percent of all the e-devices

that are collected for recycling in the United States end up being exported, mainly to Asian countries. An official of the U.S. EPA has even declared that export is part of its e-waste management strategy. Singapore and countries in the Persian Gulf are often cited as transit havens en route to importing countries like China, India, Pakistan, Thailand, Nigeria and Brazil. The e-waste trade and recycling network thereby spans the globe, and in the end brings many of the products back to the developing countries which manufactured them, thus enclosing both toxic ends of the manufacturing-consumption-disposal loop within the developing world.

A Long Way To a Solution

So what is being done to tackle the problems of e-waste, its hazardous recycling and its trade? In Delhi, a number of awareness-raising initiatives are being taken by NGOs and foreign development agencies, both to inform Indian consumers and also to teach the poor people in the recycling sector about the harmful health and environmental effects of their activities. The government, however, has been slow to act. For a long time it even denied the existence of the problem, although recently it has begun to develop some e-waste regulation. And this is exactly what Indian stakeholders are waiting for, especially regarding regulations for the recycling industry. There are very few official recyclers in India that have the facilities to engage in environmentally-friendly recycling. Without such companies in place and supporting e-waste regulations, big-brand manufacturers will have no incentive to organize take-back programs for their products.

At the same time, to fully address the problem of e-waste recycling and disposal, India would also need to enact stronger

import controls to make sure that illegal imports diminish sharply in the future. It cannot meet this challenge alone. Exporting countries must also engage in sharper control of their borders in order to prevent illegal or fraudulent shipping of old e-products, and as such, adhere to their obligations under the Basel Convention.



Circuitboards
Chris Jordan

One of the biggest challenges on this front is to convince the United States to ratify the Convention (which it thus far has not), as well as the important 1995 amendment to the Convention which bans exports for disposal and recycling purposes. In doing so, the United States would live up to its responsibility as an environmentally accountable country. Unfortunately, that day is not yet in sight.

Big-brand owners such as Dell and HP are also getting involved in e-waste governance. They are increasingly establishing product take-back systems, although critics accuse them of using double standards, as they are apparently selective in the choice of countries in which they set up these programs. This type of producer responsibility is actively being pushed for by many countries too. The European Union has taken a leading role in this respect, not only with its Directive on take-back, which assigns physical and financial responsibilities to producers, but also, through another Directive on the restriction of the use of certain hazardous

materials in electronic devices sold in the EU market.

Furthermore, the big-brand companies are also taking responsibility in the new types of public-private partnerships that are being established at the global level. Under the umbrella of the Basel Convention, two of these partnerships—one on mobile phones and the other on computers—are being established in cooperation with several NGOs and recyclers. The United Nations has a similar type of large multi-stakeholder partnership called "Solving the E-waste Problem" (StEP), initiated by the UN University and supported by the United Nations Environment Programme and the United Nations Conference on Trade and Development. StEP is mainly comprised of private companies and research institutes. The goal of these global initiatives is to develop global standards, guidelines and "best practices" for, among other things, recycling, refurbishment and redesign processes. A striking feature of these public-private partnerships, however,



Sorting computer wires for burning, Guiyu, China
© Basel Action Network 2007

is their domination by Western countries and large companies. As a result, the inequality inherent in the problem may be perpetuated in its solutions.

NGOs are not lagging behind either. Besides being involved in some of the above-mentioned partnerships, they have developed their own ways of fighting the global e-waste flows. The U.S.-based NGOs BAN and SVTC have initiated a project which focuses specifically on the recycling industry. In 2003, they established the "Electronics Recycler's Pledge of True Stewardship," a voluntary initiative which electronics recyclers can sign onto and thereby agree not to export their waste to developing countries. As of October 2007, 54 companies had signed up, only two of which are not American. At the moment, it is being investigated whether the Pledge can be transformed into a fully-fledged certification system with third party auditing.

Greenpeace, another important NGO working on the e-waste issue, has



Burning television in Lagos, Nigeria
© Basel Action Network 2007

established the "Guide to Greener Electronics," in which it ranks several of the major electronics firms on the basis of their policies and practices on toxic chemicals and recycling. At the same time, they have targeted Apple specifically through their "Green my Apple" campaign, by means of which they want to push Steve Jobs and Apple—which consistently scores poorly in the Guide—into greener behavior. The fight is not yet won; Greenpeace recently announced that its research has shown that Apple's latest toy, the iPhone, contains toxic brominated compounds and hazardous phthalate ester-containing PVC.

In the end, all stakeholders share the responsibility for ensuring that this problem will be solved sustainably. From the design of the products up until their reuse and recycling, consumers and producers have to make sure that no person on the planet bears more than his or her fair share of the e-waste burden. For problems such as this, it is important to link the global processes of trade and production to local issues of environmental health and public safety. But as is the case with many other issues, this is not a stand-alone problem. If all exports

to poorer countries stopped today and all produced e-waste in every country was processed by formal and environmentally friendly companies, the poor people that are now involved in e-waste recycling would still have to find some other means for survival. Most probably this would involve recycling of other materials. One proposed solution is the formalization of all hazardous aspects of e-waste recycling, while keeping the informal sector recyclers involved in the collection and first-phase dismantling of electronic devices. In this way, the poor people working in the informal sector would no longer be engaged in the environmentally unfriendly and health-threatening recycling of e-waste without the proper technologies. This would, however, still not be close enough to an integral solution for these urban poor. Unless policies for poverty reduction are integrated in local e-waste policies the true victims will not be helped sustainably. And this should exactly be the goal so as to make sure that tomorrow we can all live in a globally and safely connected high tech world. ♪



Corporate Toxins Rescue Planet from Climate Change

L.A. RAHDER

Deep inside the world's scientific institutions, a new solution to climate change is brewing. This time, instead of relying on shortsighted fixes like planting trees or reducing carbon emissions, our salvation is full of toxic-sounding chemicals like atrazine, ethidium bromide and methyl methanesulfonate. By increasing genetic mutations, the basic fuel of evolution, this radical new approach aims to give humans—and the rest of life on earth—a leg up in the race against global change.

The bold new strategy is referred to as Accelerated Evolution, and it draws on the very foundation of evolutionary theory: natural selection. The history of life on earth has been a constant battle between the pressures of the environment and the ability of living things to adapt to these constraints. These adaptations are made at the genetic level, in the form of mutations, and successful mutants are "selected" to survive and create the next generation of well-acclimated organisms.

According to proponents of Accelerated Evolution, climate change isn't a problem—it's simply the newest pressure that life has to adapt to. And in order to meet this great challenge, evolution needs a helping hand. By increasing the number of mutations in humans and other species, scientists hope to help create a new era of life that is naturally well suited to heat, high carbon dioxide levels and acidified oceans.

The world leader in this new science is Germany's Core Ruption Accelerated

Adaptation Project (CRAAP), named for evolutionary chemist Jim Ruption, whose self-experimentation on the chromosome-altering potential of nitrites (commonly found in preserved foods, like Twinkies and Slim Jims) resulted in a tragic and mysterious early death.

"We bring a unique neo-Darwinian perspective to the arguments over climate change," said Frau Dulent, spokesperson for CRAAP. "Forget everything you've heard about economic or energy adaptations to climate change—evolutionary adaptation is the new way forward. Without the help of our visionary corporate partners and their commitment to increasing the mutagenic potential of the human race, we're going to be left in the carbon-rich dust."

D. Praved, head of Mutagenic Outreach at Kraft Foods Inc., agrees. In his work, Mr. Praved has built strong public-private partnerships in support of Accelerated Evolution, even reaching out to corporate competitors such as Monsanto, Pfizer and Coca-Cola. "This 'evolution' thing not only provides a solution to our Al Gore problem, it's also great for profits!"

Citizens' groups are cautiously optimistic about the proposal. One representative of a local climate education group, Cecilia Informed, thinks the Core Ruption scientists may be onto something. "It's just like in X-Men. Mutants are the wave of the future," Miss Informed commented. "Besides, this means now I don't have to quit smoking." ♪

BBAGE

AND UNBALANCED

Quiz

Do you deserve a Nobel Peace Prize?

I think we all felt a little cheated when this year's Nobel Peace Prize was awarded in part to a man whose primary contribution to the world was making a PowerPoint presentation and then filming a movie of himself delivering it. I know I certainly did. I mean, who among us hasn't made a really kick-ass PowerPoint or overcome the urge to star in our own movie? Don't you have what it takes to be a Nobel Prize winner?

1. Which of the following best describes your prior work experience?

- A. One term Vice President
- B. Two or more terms Vice President
- C. Some Senate or House
- D. Head PowerPoint Programmer
- E. Librarian / Other

2. For which invention are you most proud to take credit?

- A. The cotton gin
- B. Sliced bread
- C. The Internet
- D. Fire
- E. Other

3. What is your preferred mode of transportation?

- A. Stage lift
- B. Limo
- C. Limo to stage lift
- D. Popemobile
- E. Other electric vehicle

4. What would you keep in a lockbox?

- A. Your Social Security benefits
- B. Your mortgage
- C. Your nation's mortgaged future
- D. Drugs
- E. Important papers

5. What was your most satisfying experience of 2007?

- A. Successfully convincing world that global warming is real
- B. Ending world hunger
- C. Having your book selected by Oprah's Book Club
- D. Sending away for free Cheerios T-shirt
- E. Building homemade gravity bong / Other

6. What is your favorite Stan?

- A. Totally Kyrgyzstan
- B. Waziristan (south siiiiiiiiiiiiiiide!)
- C. Kurdistan
- D. Tatarstan (mmm, tatars)
- E. Fluoristan

7. Which of the following is most important to you, even more than your children's lives?

- A. Peace
- B. Freedom
- C. Reliable supply of Middle Eastern oil
- D. America
- E. Braiiiiiiins

8. Which of the following were you up until 3 am last night debating?

- A. How to end world hunger
- B. Apple v. PC
- C. Britney v. Xtina
- D. Bush v. Gore
- E. Legal validity of pinkie-swear

9. You finally won the Nobel! What's next for you?

- A. A whole lot of FreeRice.com
- B. A Super Bowl ring
- C. A serious bender
- D. Breaking the record for most continuous time riding Space Mountain
- E. \$ \$ \$

In the next issue:

Are your quixotic world-saving tendencies interfering with your social life?

Sure, you've managed to acquire all the basic necessities of life within a 250-mile radius of your yurt without harming any organisms above the primary producer trophic level, but when's the last time you updated your MySpace page?

Six Scary Things About the Illegal Bushmeat Market

6. The word 'bushmeat'
5. Bloody suitcases filled with meat
4. The possibility of avian flu infiltrating the U.S.
3. The possibilities for TSA to discriminate more at the airport
2. Thinking about eating rodents . . . and enjoying them
1. Disembodied monkey paws

Top Six Looming Environmental Crises

6. Desertification
5. Tropical deforestation
4. Sea level rise
3. Plague of locusts
2. Drinking water shortages
1. The Great Houseplant Withering of 487 Maple Terrace

Top 7 Underappreciated Effects of *Global Warming*

7. Your house is now on the beach
6. Your neighbor's house is now underwater
5. Range of piña colada expands deliciously northward
4. No longer fear loan shark from Tuvalu
3. Exhibitionists finally have legit excuse for wearing less clothing
2. End to distasteful practice of baby fur seal clubbing
1. Summer vacation extends through December

Lamest Green Superheroes

7. Fernelious the Great
6. The Old-growth Avenger
5. Spotted Owl Woman
4. Micro-Creditor
3. Recyclotron
2. Quinoa the Liberator
1. Sustainable Development

Top 10 Least Pesticide-Laden Fruits and Veggies

10. Cabbage
9. Bananas
8. Kiwi
7. Asparagus
6. Sweet Peas (frozen)
5. Mango
4. Pineapple
3. Sweet Corn (frozen)
2. Avocado
1. Onion

data from www.foodnews.org

Top One Gripes of *SAGE* Magazine Readers

1. Magazine nothing but a bunch of hastily constructed lists

Top Four Green Pets

4. Frog
3. Snake
2. Lizard
1. Parrot

Top Nine Green Books Recommended By Oprah

9. An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It (Al Gore)
8. Planet Earth (Alastair Fothergill)
7. It's All Too Much (Peter Walsh)
6. You: On a Diet (Michael Roizen & Mehmet Oz)
5. Facing the Frozen Ocean (Bear Grylls)
4. The Secret Life of Germs (Philip Tierno)
3. The Bible (God)
2. The Nature of Animal Healing (Martin Goldstein)
1. I Feel Bad About My Neck (Nora Ephron)

Top Nine Plants and Animals that Middle School Teachers Never Mention

9. Ass
8. Booby
7. Woodcock
6. Maleberry
5. Great tit
4. Pussywillow
3. Dik-dik
2. Burning bush
1. Gerbil

POETRY

Imparting the whole

KATE BOICOURT

I. Universe

Warm night heat wraps like a towel,
damp with drips of laughter from a distant
kitchen window.

We dart around the field,
finger-seining a galaxy of fireflies,
slipping them inside lilies,
making amber lanterns.

I could not single a cricket
from the chorus.
Soaked with sound,
everything
and nothing,
at once.

II. Sea Gleaners

Fumbling through the seaweed,
grasping hungrily
for the most mother-of-pearl,
speckles, rarities.
We are collecting
shells and junk,
skeletons.

Hearing a distant call, we look to each other,
but words are sifted through sea foam,
lightening, spreading until
relevance gives way to levity.
We linger further along the shore until
the second call
to reluctantly trudge homeward,
to brush the sand from clothes and skin.

III. Apartment

Even the sunlight here is cold,
first a tease on a broken horizon,
exposing the tops of buildings,
bleaching pockmarked walls and
streaming into empty windows,
white-washing someone's solitary streetside
petit déjeuner.

To live here I think
I'd have to learn to fly,
that I might wake in the early hour
and steal upon my wings a private solstice
before all else woke from tender sleep.

Clearing

MIA NUSSBAUM

All that day Jesse and I felled trees in a government forest. Sixteen and seventeen and wearing fatigues, we used a mattocks, an ax and two rusted saws. We kept maxi pads in our hard hats for a sterile compress if we got cut. Scott Paper took the old growth in 1909. They left one crowned grove, needling the sky, the damp floor swept and us, led there, hushed and suddenly in proportion. Now we were in the tangle of undergrowth—rotting vanilla Ponderosa, Lodgepole and Western White Pine. Jesse shouted the rules of baseball over dusty sawpulls; I sang songs from West Side Story and the Ramones. We broke to eat sandwiches and wait for a Sasquatch.

When the trees creaked, we stood well and stood still. They were loosed arrows and lit lines of gas, sledding swift deaths down Blue Mountain. Like paper-planes, notes in balloons and other entities released in our youth, we did not know where they would land, just rose and whooped and watched them go.

Global Warming Haiku

JED HOLTZMAN

when we're all baking
the senate will still sit in
air conditioning.

as winter sets in
the trees become skeletons
is warming so bad?

when they auction off
the carbon credits, will the
guy say "going once . . . "?

when the north pole melts
santa will come to new york
and not to give gifts.

Creating a Community

REBECCA WATTERS

Students fishing through garbage cans may not be consistent with the image that prestigious universities wish to present, but if the students are artistically inclined master's candidates at the Yale School of Forestry and Environmental Studies, their actions may turn out to be a better illustration of the school's philosophy than any glossy brochure. This fall, surrounded by Styrofoam and plastic containers from the lunch vendors down the road, student artists created a week's worth of waste sculptures to decorate the lawn at the school and prompt fellow students to think about their environmental ideals and their consumption habits and see if the two actually intersected. Webs of string woven through tree branches captured Styrofoam containers and bright red plastic cups; a spiral of paper coffee cups climbed the school's signpost; disposable chopsticks, plastic forks and spoons, and coffee stirrers were woven into mats. In conjunction with the waste sculpture campaign, the student artists placed reusable dishes in the school's kitchen, and the waste sculptures diminished day-by-day as more students took the dishes down to the vendors' carts and returned to school Styrofoam-free.

Asking people to change their behavior without coming across as holier-than-thou requires creative thinking, and the environmental movement is a good place to test the ability to get a message across in a positive way. Faced with diverse challenges that cross academic disciplines

and incorporate multiple interest groups, environmentalists are forced to think innovatively, whether as scientists or as policymakers, as green business managers or environmental journalists—or simply as environmentally conscious citizens in a world that seems unable to prioritize conservation. The waste sculpture campaign is just one example that helps prove the point. For some of us, though, it's not simply a question of being creative in response to a demand for creativity—it's a question of finding a place and a community for our art.

The waste sculptures were the inaugural event for a group of environmental students focusing on the role of the arts in the environmental movement, and on building support for the creative expression that is so important to anyone with artistic leanings, even if they are not professional artists. At the first meeting of the group, dozens of ideas poured forth, from waste sculptures to guerilla street art campaigns, from an environmental film festival to iPod battles for environmental causes. Each of us spoke from the base of our own creative strengths, but the enthusiasm for all of the ideas was overwhelming. For those of us who have wrestled with the question of what our artistic talents mean if we intend to pursue a profession not directly related to them, the sense of support and enthusiasm proved that the environmental movement was a great place to be an artist, and that there may

not be much of a contradiction after all. The interplay between the need for creativity in the environmental community, and the talented and creative people who seem drawn to it, offers an incredible energy to both the movement and the individuals.

The waste sculptures on the lawn were not works of fine art, but they were a creative way to bring a community together, ask a question, and induce change. Sometimes the work of art is about skill and technique, and there are many skilled artists in the group, capable of producing great work even without the social content. The works of some of the group's members are masterpieces, as well as thought-provoking: the tiny graffiti stickers made by one group member, featuring what appears at first to be a bird sitting on a branch—until you look more closely and realize that the "branch" is the tip of a rifle. Or the extraordinary, energetic raps of two other group members, poetry and the plea for a change of perspective combined. Sometimes a work of art is about changing people's minds, sometimes it's about the evolving mind of the artist, and sometimes the two meet and merge in perfect synthesis. When that happens, it's clear that creativity is the beating heart of the environmental community, and that for those of us lucky enough to be both environmentalists and artists, we have found the perfect place to be. ✧



Olympic Sculpture Park • DANA WU

