

CARNEGIE COUNCIL *for Ethics in International Affairs*

Shefa Siegel on the Ethics of Mining

Ethics & International Affairs Interviews

Shefa Siegel, John Tessitore

Transcript

JOHN TESSITORE: Hello, and welcome to another episode in our special *Ethics & International Affairs* Interview Series, sponsored by Carnegie Council for Ethics in International Affairs. I'm John Tessitore, executive editor of Carnegie Council and editor of *Ethics & International Affairs*, the Council's quarterly journal. *EIA* is now in its 27th year, and it is published by Cambridge University Press.

With me today is Shefa Siegel, whose most recent article, which is titled "[The Missing Ethics of Mining](#)," appears in the [Spring 2013 issue](#) of *Ethics & International Affairs*.

Welcome, Shefa. Very good to have you with us.

SHEFA SIEGEL: Thank you very much. I'm glad to be here.

JOHN TESSITORE: Shefa was most recently associate research scholar at the Earth Institute's Vale Columbia Center on Sustainable International Investment, which is at Columbia University, and previously he worked as an advisor for the United Nations Industrial Development Organization and for Natural Resources Canada. His writing has been featured in *Haaretz*, *Yale Environment 360*, and *Sojourners* magazine, among others. He has a Master's Degree in environmental policy from Tufts University and a Ph.D. from the department of mining engineering, the University of British Columbia.

So let's begin. Shefa, in your essay for *Ethics & International Affairs*, you note that [George Orwell](#), of all people, in his book *The Road to Wigan Pier*, refers to mining as "the metabolism of civilization," a wonderful phrase. Talk to us about the central importance that mining has had in the development of human civilization and of its continuing importance for our daily lives.

SHEFA SIEGEL: Thank you. It is a wonderful phrase. The term "Orwellian phrase" is so often used to represent something that we think of negatively.

JOHN TESSITORE: Of course.

SHEFA SIEGEL: But of course, he was such a great master with the language. That use of the term "metabolism," I've never seen it used that way before. He was referring specifically to coal mining in that passage in *The Road to Wigan Pier*.

JOHN TESSITORE: As an Englishman, I'm sure he saw a lot of that.

SHEFA SIEGEL: Well, it was an interesting case. He was sent up to northern England in 1936 or 1937 by his publisher, [Victor Gollancz](#), who was a socialist publisher and had a kind of book club, called the [Left Book Club](#). Gollancz had helped Orwell tremendously, because when Orwell wrote

Down and Out in Paris and London a few years before that, nobody wanted to publish it. I think it went unpublished for two years, maybe even three, before Gollancz picked it up. So he was an important character for Orwell.

But then, in 1936 or 1937, he sent Orwell up to northern England, in the middle of the [Depression](#), to go and report on the lives of the coal miners in northern England. Orwell has, of course, in the book great descriptive passages about going deep into the coal mines, and he writes about it in a way that only he can.

But he also came back from the experience, I believe, having his view of socialism altered to some extent, because he and Gollancz ended up in argument over the nature of socialism. Orwell came back from that experience and he used the entire second half of the book to say to the socialists that they were overly concerned with things like wearing sandals and drinking fruit juice and not enough with the real fundamental kinds of changes that would be needed to alter the economic trajectory that the country and the world were on at that point.

Gollancz, for the first time in the history of that book club, wrote a preface to the book saying that he hated the book, and he accused Orwell of overvaluing beauty.

JOHN TESSITORE: Was Orwell an early environmentalist?

SHEFA SIEGEL: That's my sense of where that conversation would have gone, had it continued for another 20 years.

JOHN TESSITORE: So at least that hasn't changed in nearly a century. There's still the issue of scarring the earth and the environmental degradation that accompanies the physical act of mining.

SHEFA SIEGEL: I think the way I read that part of the book, at least, is that Victor Gollancz at that point was part of the group of socialists who believed that as long as the state could take over the extractive industrial enterprises, it would alter the nature of those economies. Orwell, I think, came back from that experience reporting on the poverty of the coal miners and the experience of the coal miners unconvinced by that perspective. He seemed to feel that it wasn't just a question of whether mines were run as capitalist or socialist institutions, that there was something else more fundamentally problematic about the extraction of resources.

JOHN TESSITORE: So we aren't talking about the humanitarian and moral dimensions of mining; we're talking about the human dimension of mining. Sticking with that, has that changed in 1,000 years? We know that we continue to mine for ever newer and more resources. Tell us about some of those new resources and what is driving this process of mining. How come we haven't completely left? Coal isn't the most important issue anymore. If we were to eliminate coal, we would still have mining, wouldn't we?

SHEFA SIEGEL: Yes. Well, it has changed and it hasn't changed. To come back to your first question, when Orwell said "this is part of the metabolism of human civilization," he meant, of course, alongside agriculture. So that question: What brings us progress and development, agriculture or mining? Of course, the answer is both.

But the question, and almost the sense of failure and dignity about the role of mining, goes back at least as far as the Roman naturalist [Pliny the Elder](#). I'm sure you could trace it farther than that. I just don't know where else it would go.

Pliny the Elder, in one of his many books in his collection of natural history, calls mining "the origin of avarice, the beginning of all greed," and says that if you could find the first person who put a gold ring on his finger and said, "Now, this is what has value," that's the person he would kill. He romanticized the [Homeric](#) barter economy, where everything was above the ground. That was his sense of, for lack of a better term, original sin. If humanity had just stayed above the ground, we would have been a more peaceful species.

JOHN TESSITORE: Interesting. We're going to come back to this issue of gold a little later. But right now let me say that the title of your essay, "The Missing Ethics of Mining," suggests that there has been a failure to systematically think about the many moral questions that arise from the practice of mining. What are these ethical issues exactly? For example, we mentioned the environment, social, political. What to you are the key issues, and why?

SHEFA SIEGEL: When we're talking about mining today, you have to differentiate from the mining that Pliny the Elder would have been writing about roughly 2,000 years ago and the mining that starts at the end of the 19th century. That's a major marker in the history of mining.

JOHN TESSITORE: Specifically why?

SHEFA SIEGEL: What happens between 1890 and the turn of the century, is the discovery and perfection of chemical processes for the extraction of what are called low-grade ores, which just means less of the material you're pursuing per ton of ore or dirt. Up to that point, it had been common knowledge that many of the deposits that were being mined all over the world still contained large amounts of the minerals and resources that we were pursuing, but we didn't have the means to extract those.

The difference between, let's say, the [California Gold Rush](#) and what happens 45–50 years later in the copper/zinc/gold fields in Montana is that when we're talking about the California Gold Rush we're talking about situations where you could pluck plum-sized nuggets out of the rivers. The great mining historian, [T.A. Rickard](#), talks about miners being able to extract as much as an ounce per day of gold.

JOHN TESSITORE: And doing it with the lowest level of technology.

SHEFA SIEGEL: Right. The industrial revolution comes rather late to mining. It comes 40 years later, or so, than in agriculture. The California Gold Rush is still more or less what we would think of today as what I call in the essay either practical—or what's now generally called artisanal—mining.

That's still the way people think about gold mining today. If you say to somebody who has never thought about gold mining at all, "Let's talk about gold," they immediately go to the California Gold Rush. That's what that kind of mining is.

Towards the end of the 19th century, beginning in the early 20th century, what you get is the processes using much more complex chemicals, especially cyanide, but lots of other chemicals, that allow for what were at that time waste heaps to be processed again so that you could extract the ores that contained roughly one to two ounces, on average, per ton, as opposed to having visually recognizable deposits in the ore that you could extract without those kinds of complex chemicals.

Just to be clear, the use of chemicals predates the end of the 19th century. There was, of course, mercury use long before that, but it's the adaptation of the new chemical technologies that transformed the industry around the end of the 19th century.

JOHN TESSITORE: So mining is linked to chemistry?

SHEFA SIEGEL: Yes. The revolution in chemistry that happens at that time—

JOHN TESSITORE: Facilitated that kind of mining, which did not exist before.

SHEFA SIEGEL: Absolutely.

JOHN TESSITORE: Talking about not existing before, why have we not had any kind of comprehensive ethical evaluation of the practice of mining?

You mentioned in your essay, for example, that in [Agenda 21](#), which is the voluntary UN agreement that concerns sustainable development, mining, for some reason, goes unaddressed. Why has mining been the orphan in this process of ethical evaluation?

SHEFA SIEGEL: That's a curiosity. The clearest answer I can give you is I don't know.

JOHN TESSITORE: Fair enough. Let's speculate.

SHEFA SIEGEL: My guess is that there was a break in the development of what we now think of largely as the international system. In 1950, the UN created what was called the Technical Assistance Administration, which predates the creation of the UN Development Programme by 15 years. The person they put in charge of that organization was named [Hugh Keenleyside](#). He was a Canadian historian. He had been an ambassador during the [war](#) and at the time was serving as the deputy minister of mines in Canada. So here was somebody who had experience with mining and had given a lot of thought and had worked closely with economic geologists in Canada to try and understand what was going on with resource wealth.

JOHN TESSITORE: We should mention that Canada has a long history of mining, a very large part of its GNP, I suspect. I should also mention, Shefa, that you are a Canadian, are you not?

SHEFA SIEGEL: I am proudly Canadian.

JOHN TESSITORE: We have all our cards on the table, okay. So this gentleman was selected.

SHEFA SIEGEL: I'll go even farther. The reason that I came across Keenleyside was because Keenleyside was instrumental in helping my grandfather get out of Australia, where he was marooned during the Second World War. That's the only reason I stumbled onto Keenleyside's books, and soon discovered that he was the first director of what we now think of as international economic development for the United Nations.

JOHN TESSITORE: Really? A little known part of history. This may be worth yet another essay.

SHEFA SIEGEL: I've always wanted to write a long essay on Keenleyside. I think he's a very interesting character, and forgotten.

JOHN TESSITORE: I think there's hundreds of young academics who are listening to us right now who are scrambling now to look up his books, because this is going to be the perfect subject for a little-known treatise.

SHEFA SIEGEL: I hope they don't beat me to the essay then.

He published what I think is a terrific book. I think it was around 1965, maybe a little bit later, that, if I recall, is just called *International Aid*. It's written in that great style of that generation, where the first 70 or 80 pages tells the entire history of the world. You couldn't just say, "Here's the history of the United Nations and international economic development as we know it." You had to start from the beginning. I always admire that kind of literary style.

JOHN TESSITORE: You can't get it on Twitter.

SHEFA SIEGEL: No.

Keenleyside had emerged as a player in the international world at that time, in large part because he had given thought to what was going on with mineral resources. He had been invited to a conference in 1949 to speak directly to that issue. He had been sent on the first UN Technical Assistance mission when the New York Secretariat was being developed. He had been sent to Bolivia, in part to study the tin industry at that time.

They had just come out of the Second World War, and he had watched as the world had spent down its mineral resources tremendously during the war. He said we cannot continue to waste our mineral resources on what he called "the barren struggles of war." From that period, from the *First World War* to the end of the Second World War, the United States had gone from being 96 percent resource-independent to being a net importer of resources. He was watching this move toward greater mineral use, massive population growth, and the speed of development.

JOHN TESSITORE: And the exhaustion of the resources themselves.

SHEFA SIEGEL: He was concerned about that. He was saying, "We're not there yet, but this is something that needs to be a critical issue."

But then it doesn't happen. The Technical Assistance Administration, the TAA, fails. It is never funded. The expectation was that Truman would put the money in to finance that organization properly.

Instead, what we got was this split of economic development and what we would now think of as international environmentalism. They didn't quite call it that at the time. But those two paths split from each other, whereas if you go back to Keenleyside's writing, they are very much the same thing. So I think that if that international philosophy had succeeded, that we would have seen a much deeper ethical discussion about the relationship between environment development and resources.

JOHN TESSITORE: In fact, they now almost appear to be antagonistic, in that one is clearly geared toward the bottom line, corporate profit, and the other is seen—is it fair to say?—as an impediment to that corporate profit?

SHEFA SIEGEL: I think that that's the tension.

JOHN TESSITORE: Yes, that's a good word.

SHEFA SIEGEL: Yes. All I mean by that is the emergence of the environment as a key issue inside international institutions—the United Nations, the World Bank, and all of those postwar institutions—I read that as a countermovement.

What had happened was the 1960s was called the Decade of Development officially by the United Nations, whereas Keenleyside and those kinds of people—I'm sure that the Canadian Lester

[Pearson](#) would have been on board with this as well—were looking at development within limits. When the Decade of Development emerges in the 1960s, there is no sense of limits that's attached to that.

When you get the emergence of the international environmental movement, it wasn't a fringe thing. We're talking about people like [George Kennan](#), who was deeply involved in it. He wrote a wonderful essay that came out in 1971 called "[To Prevent a World Wasteland](#)." He makes a spiritual case, not an economic case, for the need for a real environmental movement.

JOHN TESSITORE: That was just about the time that United Environment Programme (UNEP) came into being. I think that was 1972.

SHEFA SIEGEL: The way I read the emergence of the Environment Programme in 1972 is as a countermovement to the idea of economic development in the 1960s as being without restraint. Part of that is the growth of mining during that period—but not just the growth of mining. We would always expect that there would be growth of mining as the population is emerging.

JOHN TESSITORE: It's the nature of mining.

SHEFA SIEGEL: Yes, it's the nature of it and it's the inability or unwillingness, or even total ignorance of, the notion that there might have to be some kind of limit set to what you can do.

JOHN TESSITORE: You actually say that over the past two decades—now we're talking in the 1990s and into the 21st century—that the efforts have generally been focused on two principles: you mention transparency and corporate social responsibility. These are two wonderful, happy, glowing terms that all we liberal and environmentally-oriented people can embrace warmly, except that we always think of corporate social responsibility as being something of a sham, that corporations can wave their social responsibility and get a lot of public credit for it, but what's really happening behind the scenes is a different story. That seems to suggest that transparency isn't all that transparent.

In your words, what is really going on? In fact, you even say, and I'm quoting you, that both of these "are intended to transform resource extraction from a winner-takes-all model to one in which all parties benefit," which is a lovely concept. But then you say, "It is an illusion." That's a pretty severe pronouncement, "it's an illusion." Is it an illusion because it just can't be done? Is it an illusion because the powers-that-be don't really want to do it? Tell us what you think is going on.

SHEFA SIEGEL: I think that the idea that we now commonly call a win/win avoids the reality of what [Isaiah Berlin](#) would have said as "to choose is to lose," that there are choices that have to be made in all of these kinds of decisions.

The idea that we can have everything and impose no restraint is wrong. The reason I'm saying that in the context of mining is that, where we were talking a few minutes ago about the emergence of the ability to extract low-grade ores at the end of the 19th century—what was a low-grade ore at the end of the 19th century? An ounce, two ounces, per ton. What's a low-grade ore now? A gram per ton and less, especially with gold, now down to places where the mines that are being proposed for either new exploitation or expansion or going back to them after they have been closed, they are at a gram per ton, or half-a-gram, or even less, per ton. What that necessitates is an expansion of the total space that is needed in order to profit from that.

JOHN TESSITORE: Your article has described these very movingly. You write beautifully and you have told us what it's like to see an actual mine that has been expanded.

You've also told us about waste pools. Describe that for a moment for our listeners. What are some of the things you have seen? Tell us what it looks like. Bring us there.

SHEFA SIEGEL: A gold mine in the previous, let's say, generation, over a 40- or 50-year period, would have processed a total of 7 to 10 million tons of ore. Now that's what's happening in a year in these mines. In order to get 10 tons of gold, you need to move 10 million tons of ore. It's hard to make sense of that. What is 10 million tons of ore exactly?

So when I have been with people, especially when I go with people who haven't been to a mine before, the first thing they often say is, "It's like the Grand Canyon," because you're opening up the space, you're taking the earth, you're flipping it upside-down. I'm not coming out and saying that that has to be a bad thing. What I'm saying is that the scale of that is very intense to experience.

JOHN TESSITORE: We say in this country, "How many Rhode Islands have been dug up?" And then there's the waste.

SHEFA SIEGEL: Because we're at a point where the scarcity of the resource is such that in order to extract those 10 tons of gold you have to move 10 million tons of earth, almost everything that you're processing is waste. All of that waste is treated with complex chemicals that do not break down easily in the environment. Some of it can be burned off, most not.

So what we create are massive toxic wastes. They're technically called tailing storage facilities, TSF. If you want to come back to an Orwellian term, that's an Orwellian term. When you come across them and if you're not prepared for it, you think you're staring at a big lake when you first see it. It only then becomes clear that what you're looking at is a deposit of toxic waste that will not go away and is growing all the time. When we think about that, what I have a lot of trouble with is where a lot of the expansion of the mining is happening right now, in places like sub-Saharan Africa or in Mongolia or other parts of the developing world.

We have done a particularly bad job in our own country of remediating and restoring those kinds of toxic waste sites. The Berkeley Pit, to give one example, which is the toxic waste residue of the Anaconda mine in Montana, is one of the most polluted places in the world, and will always be one of the most polluted places in the world. Those are places that have to be managed in perpetuity. With all of our expertise and all of our knowledge, we have a hard time doing that properly. I have trouble seeing how that problem is going to be resolved in Guinea or Burkina Faso or Tanzania or any of the places that are now being exploited.

JOHN TESSITORE: Particularly if their governments don't require it of the mining industries. And these mining industries, of course, are not indigenous; they are global companies, are they not?

SHEFA SIEGEL: That's right.

JOHN TESSITORE: Where do these mining companies come from?

SHEFA SIEGEL: There's a large base of the companies in my own country, in Canada, but also in the United States and Australia and South Africa. Those are major players in the mining sector. You also have Russia, and of course the Chinese are a major player.

JOHN TESSITORE: In your essay, you have talked about the rising price of gold, and you have argued that mining companies have deliberately driven up the price so that it becomes affordable to extract lesser amounts per tonnage. This is an interesting kind of self-generated, self-fulfilling

prophecy, where you manage to spike the price in order to accommodate your costs and still make your profit. What exactly are mining companies doing to cause the price of gold to rise, and what is the effect of what you call this "asset bubble" on mining practices worldwide?

SHEFA SIEGEL: I want to be clear that what's called "the greatest asset bubble" is not my term, it's [George Soros's](#).

JOHN TESSITORE: You're right.

SHEFA SIEGEL: Soros, not three or four days ago, sold half of his shares in gold. Apparently, that's the second time that he has done that in the last couple of years. I don't know what that means exactly, but he is playing around in that field, along with many others.

If you ride the Metro North in New York these days, you might see an ad that says, "There is no pot of copper at the end of the rainbow." They are ads for what are called exchange-traded funds that allow people like us to buy and sell small shares of gold like any other asset.

JOHN TESSITORE: That has changed the way gold is.

SHEFA SIEGEL: Revolutionized it. Evidently—I didn't understand this either—the reporting for this came from an excellent investigative reporter named [Cam Simpson](#), who writes for *Business Week*, now *Bloomberg Business Week*. He put out this [story](#) a couple of years ago.

What happened was that the World Gold Council, which is a consortium of the major mining companies in the world, hired [Mitt Romney's](#) organization, Bain & Company, to do an assessment: How could they expand the investment in gold? At that point, the price of gold was flat at around \$250 per troy ounce, and that was up until 2001.

The investment was principally for jewelry. That actually has all kinds of interesting implications, the way that jewelry is used as an investment around the world. Especially for women, it's a very important investment—I mean women in the developing world.

JOHN TESSITORE: Yes. It has cultural dimensions as well, as we know, in certain developing countries.

SHEFA SIEGEL: That's right.

But what Bain & Company recommended was the creation of what are called exchange-traded funds that allow gold to be divided up virtually—

JOHN TESSITORE: To get more people into the game. They become more competitive and, therefore, drive the price up.

SHEFA SIEGEL: That's right. So if you look at total gold production over the last 10 years, it's not rising that dramatically. I think in the last year, gold production was something like 2,700 tons, as opposed to 2,500 or 2,600 for a year or two before that. So we're not seeing massive growth in the amount of gold being mined. What we're seeing is massive growth in the speculation in gold.

What that does is drive up the price. It's now at what they're saying is kind of a low, which is \$1,600 an ounce, as opposed to \$250 an ounce. But that's actually still very high.

I've talked to mining engineers who say that if the price came back down even to \$500 an ounce, 90

percent of the gold mines that are now active in the world would have to close because the per-ounce cost of mining the gold would be too high.

That comes back to the issue of scarcity. Because there is so little left in the earth, the costs of moving all of that earth in order to extract those very-low-grade ores are just too high, unless you have the price up over a certain amount.

JOHN TESSITORE: You also talked about how certain local elites, such as tribal chiefs, for example, have facilitated these multinational companies and have made it possible for them to come into another country, set up their shop, as you say, and exploit their resources. I'm sure certain parties are well taken care of in return for this. So it seems to me that we cannot rely on local governments to regulate because local governments seem to, at least in a great many countries, subordinate the interests of their people to the interests of the corporation, and perhaps with that corporation their own interests.

So is there another way to go? For example, do we need a multilateral institution, do we need some arm of the United Nations or some new multilateral institution, to step in here and help to regulate, if that's even possible? Or do you see some other alternative? Is there any chance for self-regulation?

SHEFA SIEGEL: I think that what we are starting to see in many places—northern Canada is one place where this is starting to take off, Ecuador is another place—are significant local movements that are starting, not necessarily to protest all mining, but to protest certain kinds of mining and the pace, the rapid expansion of the mining.

There is, supposedly, a lot of local prior informed consent. But my argument is that there is nobody, including us, who can imagine what it means to see these kinds of mines pop up until they happen. It's just impossible to imagine the scale of these kinds of things.

Now, to get to your question about whether we need a new kind of multilateral organization that would be specifically focused on mining, or something of that sort, I think the short answer is yes. But the more difficult problem is I don't think that there is a lot of interest or initiative that's there for that. A generation ago, the answer to everything was let's build a new international institution. There just isn't that kind of spark or money around for it these days.

But the deeper problem is also that the institutions that do exist, particularly the development institutions, and now increasingly the universities that are focused on different kinds of mining projects, are working very closely with the industry. That, to me, is a disappointing direction.

What really needs to happen is there needs to be new investment in the way mining engineering schools are imagined. They need to become both mining engineering and reclamation and restoration programs so that they are combining the best of what we know now about ecological science with the continued need for extraction—which doesn't go away, right? The point is not to say all mining should disappear. That's not what it's about at all.

What it is saying is that we have to say, "Okay, we're now at a point of resource scarcity, so what does mining look like in the future and how do we combine that with restoration ecology?"

Instead, what we're getting is pretty big investment, to the tune of tens of millions of dollars, in programs that are called extractive industries and development programs, but you don't see the word "environment" involved in those things. In other words, there isn't yet that notion of combining mining, development, and environment. Those three things haven't come together yet.

JOHN TESSITORE: Is that even a possibility? Let's talk about the future. We are sitting here just into 2013. Mining is expanding exponentially. We are reading front-page news about mining in Mongolia, just to take one example. We are told that simultaneously you have the artisanal miner who is working independently for a small company at about the apartheid level of \$1.50 a day, and you have literally the multimillionaires—even it's said now we have billionaires—in Mongolia who obviously have benefited handsomely by their relationship with these giant companies.

It sounds rather pessimistic. It does sound like David and Goliath. Is there even a David on the horizon? We've had big oil, we've had big pharm, we've had big agriculture. Now, the one that seems to have escaped a lot of notice, except of course when something tragic happens, such as mining accidents that bring a lot of public attention—but with those exceptions, it's not on the radar screen the way the oil companies and other industries are.

So is mining going to get a pass in the public courtroom in terms of public perception and public action? Or do you see this eventually taking a turn for the better in some way?

SHEFA SIEGEL: Let's first remember who wins the battle between David and Goliath. I think that there are strong movements forming in certain places where there could be the development of new relationships and demands from communities for better resource governance in these places.

But at the moment I think that the field is skewed very heavily towards the industry. The governments and development agencies, and now increasingly the universities, are also playing a part in the increased exploitation of the resources without clear ecological or economic development benefits.

But I think, at the same time, there is real potential opportunity for increased collaboration among technicians. Right now, so much of the debate about this stuff happens at a senior policy and corporate level. But if you get a mining engineer and a restoration ecologist together and you stick them in a mine and you say, "What could you do with this place? How could you re-imagine the way a mine is developed, the way it is built, and the way it is reclaimed and restored at the end?"—those two communities don't yet know each other. I think that they have a lot to learn from each other.

When you put technical experts together like that, they have a very good time. The problem is at the larger economic scale I don't think we yet have a solution for how to mine differently in the way that was created at the end of the 19th century. We're still using the model that was created at the end of the 19th century, but in a very different period, where the resources are increasingly scarce and the economy has changed dramatically.

JOHN TESSITORE: We certainly have learned a great deal from you today. I'm afraid we need to stop here, Shefa.

Once again, we have been speaking with Shefa Siegel, whose essay, "The Missing Ethics of Mining" appears in the Spring 2013 issue of *Ethics & International Affairs*. That essay, as well as much more, is available online at www.ethicsandinternationalaffairs.org.

Thank you, Shefa, for joining us, and the best to you in your very important good work.

SHEFA SIEGEL: Thank you very much.

JOHN TESSITORE: Happy to have you here.

Audio

Mining harms the environment irreversibly, yet this is often ignored, and mining is on the increase, often without clear ecological or economic development benefits. "We're still using the model created at the end of the 19th century, but in a very different period, where the resources are increasingly scarce and the economy has changed dramatically."

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