BEN BOBLETT

PEAK EXPERIENCE

The Age Of Oil Is Coming To An End

An Interview With Richard Heinberg

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Depending on which experts you talk to, the world's production of petroleum either has already started to decline or will do so sometime within the next thirty years. The point at which the decline begins — which is also the highest point production will ever reach — is known as "peak oil." Because worldwide oil shortages will follow the peak, concern about the issue is rapidly growing.

Richard Heinberg is the author of three books on peak oil. His latest, The Oil Depletion Protocol *(New Society Publishers), outlines a plan to ease the planet's transition from fossil*

fuels by decreasing production in advance of the peak. Listening to Heinberg rattle off statistics about extraction rates and renewable energy sources, you'd swear he was a geologist, but until eight years ago Heinberg was an established author of books about spirituality and ecology.

Born in 1950, Heinberg grew up in St. Joseph, Missouri. His father, a high-school physics and chemistry teacher and later a quality-control chemist, inspired Heinberg's interest in the scientific method. Heinberg also loved music, and in college he studied the violin. Having rejected his parents' rigid Christian fundamentalism, he looked for spiritual alternatives. For a time he lived in Colorado's Sunrise Ranch, an intentional community that served as the headquarters for an organization called "Emissaries of the Divine Light." It was "a sort of benign cult," he says.

In the late eighties Heinberg started reading the works of historian Lewis Mumford, who helped him understand the history of technology from an ecological and humanistic perspective. Another inspiration was M.K. Hubbard, the late geophysicist who accurately predicted the decline of U.S. oil production in 1970. Heinberg found a mentor in Colin J. Campbell, a British Petroleum geologist and godfather of the modern peak-oil movement. It was a 1998 Scientific American *article Campbell coauthored, titled "The End of Cheap Oil," that led Heinberg to begin digging into U.S. Department of Energy databases. Just five years later, Heinberg's book* The Party's Over: Oil, War, and the Fate of Industrial Societies *(New Society Publishers) became a bestseller.*

The changes Heinberg advocates to address the impending decline in oil production are, by any standard, monumental, but he believes anything less will fail, and business as usual will result in catastrophe. The situation is not hopeless, however. In his book Powerdown: Options and Actions for a Post-Carbon World *(New Society Publishers), he writes, "We can preserve the best of what we have achieved, while at the same time easing our way as peacefully and equitably as possible back down the steep ramp of increasing scale and complexity our society has been climbing for the past couple of centuries."*

In addition to writing books, Heinberg has been covering global politics, religion, and the "origin of humanity's antipathy toward nature" in his monthly MuseLetter *(www.museletter.com). He also lectures nationally and internationally and teaches courses on energy, ecology, and sustainable communities at the progressive New College of California in San Francisco. And somehow he still manages to devote at least an hour a day to the violin, which he plays professionally.*

Heinberg lives in Santa Rosa, California, in a home powered by solar panels, and drives a biodiesel car. He and his wife, Janet Barocco, a horticulturalist and massage therapist, tend a dozen garden beds and twenty-five fruit and nut trees. They have no children by choice.

I spoke to Heinberg last February at a coffee shop in Santa Cruz, California, just before he was scheduled to give a talk for the Santa Cruz Permaculture Guild. Though he is soft-spoken in person, his passion and eloquence are undeniable.

Cooper: You say that the problems caused by oil depletion will start not when we run out of oil, but when we reach peak global production. Why is that?

Heinberg: Because the peak is the point at which production starts to decline, and we've become so dependent on cheap, abundant fossil fuels — especially oil — that we're not prepared to have less of them each year rather than more. Oil is the most energy-dense and convenient fuel to use. More than 90 percent of the world's transportation is fueled by oil. In the United States it's close to 100 percent. So we're not talking about something that's easy to replace. We're using on the order of 85 million barrels a day worldwide.

Over the decades we've watched individual oil wells and fields go into terminal decline, and we've seen declining production in whole nations, starting with the U.S. in 1970. Since then around thirty other countries have gone into production decline. This will eventually occur for the world as a whole, though there is some dispute as to exactly when it will happen. Some say it already happened in 2005. Others say it won't be until sometime in the 2030s. But everyone agrees it's going to happen within most of our lifetimes.

Cooper: What's your best estimate?

Heinberg: Within the next four years, based on the studies being done by people who are on the ground, surveying the oil fields themselves, and also on meta-analyses, such as the ones done by M.K. Hubbert, who understood the process of oil depletion before anyone else and correctly predicted the U.S. production peak. His prediction of the global oil peak was off, but only because he didn't foresee the oil shocks of the 1970s and their effects on consumption.

Cooper: Why is the *start* of the decline such a problem? Won't supplies taper off gradually?

Heinberg: The problem is that we have created an industrial economy based on growth. A certain percentage of growth is needed each year to stave off economic collapse. So once transportation becomes more expensive — and once it becomes clear that this is not just a temporary problem of supply and demand — it's going to lead to panic. The relentless decline in availability of fuel will cause a crisis unlike any we've seen in the history of the industrial or information ages.

Cooper: You write in *The Party's Over* that renewable energy sources cannot fully replace fossil fuels. How can you be so sure?

Heinberg: Well, first of all, I think we need to be investing much more in alternative energies. What I'm against is the blithe assumption that we can simply switch from oil to ethanol or hydrogen and continue with business as usual.

The Industrial Revolution came about because we went from using low-quality energy sources to more-concentrated, higher-quality sources: from wood to coal, and then from coal to oil; later we added natural gas and uranium. As we pass the peak of oil production, and then gas production, and then coal production — which will probably also happen in this century — we'll be moving back down the ladder from high-quality energy sources to lower-quality energy sources. I think this *can* be done in a cooperative way, so that we will all be living

in peaceful, productive communities, but it's not going to be an easy transition. It's going to mean cutting back on a lot of luxuries that we've gotten used to, such as cheap transportation and moving goods around the planet at great speeds.

Cooper: Sheikh Yamani, the former Saudi oil minister and founding architect of OPEC, once said, "The Stone Age came to an end not for lack of stones, and the oil age will end not for lack of oil."

Heinberg: I disagree with what that statement implies: that the end of the Stone Age and the end of the oil age will be similar. The Stone Age ended in part because humans developed agriculture and harnessed animal energy. Any fundamental changes that we've experienced since then have involved harvesting *more* energy from the environment. Now we're going to be extracting less energy, because no new source will give us as much bang for the buck as oil. So you can't expect the two transitions to be the same.

RICHARD HEINBERG

Cooper: Do you agree with Vice President Dick Cheney that we can't conserve our way out of this problem?

Heinberg: No, I think he's dead wrong; I'm saying that we can't *replace* our way out of it. We're going to have to conserve our way out of it, because we don't have any other choice.

Cooper: What about new oil discoveries?

Heinberg: I'm sure some great discoveries will be made. Everybody's certainly assuming that they will. The problem is that the scale of new discoveries has been declining for the last forty years. Since the fifties we've been finding smaller and smaller fields. We did make some big discoveries in central Asia and Iran in 1999 and 2000, but even those are relatively small compared to what we were finding back in the first half of the twentieth century.

But suppose we found ten new Saudi Arabias — and the U.S. Geological Survey is assuming that we'll discover several. Our consumption is still growing. Let's say it's growing at 3.5 percent a year; that means consumption will double in about forty years. So even if we make some enormous discoveries, we're still going to reach a peak ten or twenty years from now.

Cooper: There's a lot of talk these days about the Alberta tar sands in Canada as a new source of fossil fuel. Could that be part of the answer?

Heinberg: There was a *60 Minutes* segment a while back touting the ability of the tar sands to meet our petroleum needs for decades to come. The problem is not the size of the resource, which is huge, nor the cost of extraction: you can produce a barrel of oil from the tar sands for around twenty-five dollars. The problem is the rate at which fuel can be extracted, which is relatively modest. We're not talking about free-flowing liquid petroleum here. Currently we're getting a million barrels a day from the tar sands — at an enormous ecological cost, by the way — and we need 20 million barrels a day in the U.S. alone. Oil companies operating in Alberta are hoping to ramp up production to maybe 4 million barrels a day by 2025 or 2030. That's all well and good, but we need approximately 4 million barrels a day of new production capacity *every year* to make up for declining production in existing oil fields.

Cooper: What are some promising alternative energy sources?

Heinberg: Well, solar thermal is very promising. From an energy-payback perspective, it's probably better than any current commercial solar technology. It works by focusing sunlight on a liquid and boiling it, then using the steam to turn a turbine or operate an engine.

There's also microhydro, which is very good for rural areas that have a stream nearby. Of course, any kind of water power can be tapped irresponsibly, as we're already doing with most of our big hydroelectric projects in this country.

Cooper: What about the promise of new, previously unimagined technology? Futurist Ray Kurzweil predicts that nanotechnology will allow us to integrate solar panels into common building materials.

Heinberg: Well, we'd better learn how to do it quick. [Laughter.] I think nanosolar is one of the more promising renewable technologies, but it's probably going to be a while before it hits the market, and even after that, we're talking about small-scale applications at first. It's going to take two or three decades to reach full-scale implementation. Now, if we have two or three decades before global oil production peaks, then that's not so bad, but if, as I and some others predict, the peak comes within four years, then it's going to be too little too late.

Cooper: What about so-called "free energy" devices?

Heinberg: They're also known as "perpetual-motion machines." From a purely theoretical point of view, it's interesting to speculate as to whether the "quantum sea" — an infinite sea of particles possessing energy — can be harnessed by some kind of quantum windmill, but most devices claiming to do this have been shown to be either hoaxes or the work of inventors who are deceiving themselves or don't know how to measure energy very well.

Cooper: You've said we're seeing the first phases of "societal collapse." Can you elaborate?

Heinberg: I use the word *collapse* in the sense that anthropologist and historian Joseph Tainter uses it in his book *The Collapse of Complex Societies*. He defines *collapse* as a "reduction in complexity." What we've seen over the past couple of hundred years is a rapid increase in the complexity of society, and that increase has been fueled by cheap, abundant energy sources. As those energy sources decline, I believe we'll see our society become less complex.

Cooper: Isn't an increase in complexity part of the evolution of natural systems, whatever they might be?

Heinberg: Yes, but there are thresholds, and when na-

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ture reaches a threshold, it remains in a stable condition for a long time. From the time you're born until you're twenty, you might grow an inch or more a year, but if you were to continue to grow at that rate your entire life, that would be a problem. [Laughter.] We assume that somehow our society can continue growing in complexity — and every other dimension — indefinitely. Obviously that can't happen. For one thing, we'll run out of resources: oil, water, topsoil.

Cooper: What can we learn about civilizational collapse from the examples of the Romans and the Mayans?

Heinberg: In both of those instances collapse took some time: decades, at least, for the Mayans, and centuries for the Romans. So we shouldn't assume that our own society will collapse overnight. And I don't think it will be an entirely destructive process. It could be destructive, in a nuclear-war scenario, for example. But it's also possible to imagine slower and more managed reductions in complexity that might just leave us better off. The Mayans' old society was extremely hierarchical, and their leaders seem to have behaved pretty irrationally, judging by texts that are now being deciphered. An argument could be made that the Mayan people are better off having returned to life in small villages. They still have their language, culture, and ceremonies, but none of the trappings of a great civilization.

Cooper: In *Powerdown* you write about the need for "new monks."

Heinberg: After the collapse of the Roman Empire, many monasteries took responsibility for preserving what was most valuable about Greco-Roman civilization. Irish monks played a key role in preserving many of the ancient texts that connect us to the classical world and the great authors of antiquity. If not for those monks, the collapse of the Roman Empire would have caused far more historical discontinuity than it actually did.

As we face collapse, we should be giving some thought to how we can preserve what's most valuable about our society. Scientific findings, for example. We've discovered principles in physics, chemistry, biology, ecology, and so on that I would hate to see lost. Yet most of this information is preserved on fragile, energy-dependent media such as magnetic tape, CDs, and non-acid-free paper. All of these media could be decayed or useless in a matter of decades, a couple of centuries at the most.

In ancient Egypt, they used papyrus to record information, but Egypt has a very hot and humid climate, and most of those papyri disintegrated. We know from the Greeks that the Egyptians had a highly developed mathematics, but all we have left are fragments showing everyday calculations. If we make the same mistake, we'll have no one to blame but ourselves. It's up to us to decide what's worth preserving and start doing it.

Cooper: Why did you title your book *Powerdown*?

Heinberg: It's a term used for unplugging or turning off equipment. I'm using it metaphorically to apply to the whole society. We need to reduce the scale of our energy usage in order to reduce demand.

Cooper: Some readers were disappointed that you didn't include a chapter on global consciousness change. Why didn't you?

Heinberg: I agree that we need to change our consciousness, but I guess I'm impatient with the idea that we can change the world just by changing our thinking. Unless we also change our behavior, it's pretty pointless.

Anthropology has shown that cultural change tends to start at the level of our relationship with the natural world, particularly how we get our food. That's why we classify societies as "hunter-gatherer" or "agricultural." Cultural change can happen also at the level of politics, ideology, or religion, but the really fundamental change starts with our relationship to the natural world. Some anthropologists call this the cultural "infrastructure," as distinct from a society's "structure" of politics and economics and its "superstructure" of ideology and religion.

We're on the verge of an infrastructural shift as profound as any in human history, on the scale of the Industrial Revolution. You might say we're going to be seeing the other side of that revolution, and it will change our political system, our ideologies, and our beliefs. The most important work we can do right now is at the level of infrastructure: finding new ways to meet our basic needs — particularly for food — in a sustainable way.

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