green door

CRASH COURSE

PREPARING FOR PEAK OIL

ZACHARY NOWAK

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Introduction

In an early draft of this book, in one of the then far-fetched scenarios, I wrote, "Crude oil prices climbed to $50, then $60, then $70 dollars a barrel, fell back, then climbed again." $115 a barrel oil is now a reality; Peak Oil, on the global scale, is still a hypothesis, but one that is getting more and more difficult to reject every day. This book takes as axiomatic that the global peak of conventional crude oil is near (perhaps in the near past) and that is may create enormous problems for how we live in the industrialized world. We are on a collision course with a difficult reality, an inconvenient truth that is much more immediate than global warming. *Crash Course* is an accelerated tutorial, a study-at-a-distance workshop on what you need to know to survive the Peak.

It is important to underline immediately what this book is not. It is not another appeal to conscience – "If we could just all use less energy and drive Priuses..." It is not a technical book trying to prove that the Peak is near, or for that matter, in our rearview mirrors. Experts like Colin Campbell and Richard Heinberg have done this much better than I ever could. *Crash Course* is emphatically not a manual of specific skills. Those who do not know how to can vegetables as they read this Introduction will be no closer to making good dill pickles or strawberry jam as they finish the Epilogue. I am not a self-sufficiency expert any more than I am a petroleum geologist. This book does not qualify as great literature – it lacks dramatic tension (mainly because there is already enough in oil prices), clever metaphors, and a happy ending.

*Chapter 1
The Predicament

*Chapter 2
Peak Philosophy

*Chapter 3
Scenarios

Crash Course is my personal attempt to articulate the problem and a reasonable response, as I see them. The book is divided into two parts, theoretical and practical. I imagine that the serious peaknik, especially one who would fall into the category of a "doomer," will skip the first part. The only thing less productive than a minister preaching to the choir is a chorister listening to the preacher. The first chapter, "The Predicament," lays out how I see the Peak Oil problem: the latest huge drop in the roller-coaster ride of human evolution. Industrial civilization is the latest attempt that humans have made at beating out Malthus, an attempt that I suspect will be ultimately unsuccessful.

Some or even most readers will likely find the second chapter, "Peak Philosophy," tedious. The cognitive exercises therein are necessary to cut through the fallacious arguments of those who believe we can invent a way out of the problem, or change the trajectory of the last five hundred years on a dime. "Scenarios," the third chapter is the most interesting and the most useful of the theoretical part of the book, as it suggests what life could be like in the future, and how various preparations are asymmetrically helpful.

The second half of the book is practical. It is based on my personal attempt to figure out what I need to know to survive hard times, but also what tools I need and where I can get them. Though there are actual tools that will be important (excellent pruning shears, salt, a good hoe, and lots of plastic and glass containers, to name just a few), the most important tool of all

is a good book. I am an expert in nothing but have on my shelf two hundred experts on a wide variety of subjects: Ianto Evans explains how to build a rocket mass heater, Eric Toensmeier describes the propagation of perennial vegetables, and Ricki Carroll helps me make great cheese at home.

The back-to-the-land movement of the 1960s and '70s is often considered a failure but these pioneers relearned old skills (producing and preserving their own food) and invented new ones (building windmills from scratch). Many of the authors presented here are refugees from the Summer of Love who have valuable lessons to teach us. There is a personal contribution in this second part of the book as well. For the past six years I have been experimenting self-sufficiency and while I am certainly no expert, I have gotten a better idea of what works and what does not. I also have been able to integrate these disparate skills into a holistic plan: it was not long after my first batch of pickles that I wondered if cattail root sprouts could be pickled.

*Chapter 4
The House

"The House" is the first chapter in this second part. While no man is an island, each of us will have to have some sort of home base to work from, a place where we can live and store our tools. The next chapter, "Food Production 101," presents some heretical views on what's on the *menu du jour* after the Peak. For reasons explained at length therein, I show how reliance on traditional annual gardening is a dangerous delusion, and offer an integrated food production plan. How to preserve the bounty of the harvest without electricity is a topic strangely overlooked

*Chapter 5
Food Production 101

*Chapter 6
Odds, Ends, & Epilogue

*Chapter 7
Resources

by most peakniks, and this chapter presents the hows and whys, as well as the books and tools you will need. The final chapter, "Odds, Ends, and Epilogue," deals with several uncomfortable topics: health and safety, as well the idea of the survivalist (and why it is a delusion) and the practical limits to preparation. "Resources" is a jumping-off point for finding more information and the sources for the tools you'll need to survive the Peak.

Reality is messy, chaos even messier. Quoting the philosopher Alfred North Whitehead in his essay "The Tragedy of the Commons," Garret Hardin says, "The essence of dramatic tragedy is not unhappiness. It resides in the solemnity of the remorseless working of things." The Peak and subsequent disorder are simply this remorseless working of things, and do not care about our ethanol illusions or hydrogen hopes. My book reflects this, and as such *Crash Course* will appeal most to the serious doomer who accepts the possibility that powerdown may simply not happen. I believe the book will, in any event, be useful to a wider spectrum of people. Even if they don't accept the idea that the Peak is both near and dangerous, the avid gardener, the dedicated independent yeoman, the back-to-the-lander, the permaculture advocate, and any other person interested in a measure of self-sufficiency will enjoy this book.

Zachary Nowak
Perugia, Italy
May 2008

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The Predicament

It is extremely banal to say, but the first step to solving any problem—or at least avoiding the worst of its consequences—is to understand the cause of the problem. With Peak Oil and the possibility of a crash, it is important to understand that this problem is much bigger than simply a maxing out of conventional crude oil extraction. It is an ecological and social problem that began millions of years ago.

Stone Age Economics

To understand the problem, we need some background information. The theory of natural selection formulated by Charles Darwin over one hundred years ago holds that traits that help individuals of a certain species stay alive and reproduce more often ("fitness") will tend to be passed on and the frequency of that trait will increase in the general population. Human beings are of course products of evolution and because of natural selection our distant ancestors evolved from more primitive, knuckle-walking primates to a bipedal species with opposable thumbs and a much-improved ability to hunt and gather foods.

The size of our ancestors' brains increased and we were better able to compete in the African savannah, though these advantages had their faults, too. Bigger brains had to develop outside the womb, so human babies (unlike baby giraffes) were unable to move independently and therefore were largely helpless for several years. This is assuming that the birth was successful at all, which was less and less probable as our cranium sizes increased. But the real break

probably came with the development of language, which was the quantum leap that humans needed to really kick off the first population explosion.

And now the dirty little secret: hunter gatherers were not the green, environmentally-conscious tree huggers we imagine them to be. With their bigger brains, improved tools, and formidable linguistic skills, their populations increased and they began to put stresses on their food sources. This is the "push" theory of the origin of agriculture, though it is important to note that there probably was an element of "pull" in it too as so-called Big Men began to monopolize the harvesting of wild grains. Jason Godesky of the Anthropik network (www.anthropik.com), in his "Thirty Theses," gives an excellent overview of the anthropological/ecological origins of our current problem, and argues that the "pull" of the Big Men was far more important to this transition to agriculture. At least part of the problem, though, was population expansion and megafauna (large game animals) exhaustion.

As their population expanded, our ancestors moved into virgin territory where the megafauna had not co-evolved with *Homo sapiens*, quickly depleting resources, slaughtering the very animals they depended on, and did so in the crucial moment of population increase. This required an increase in total calories, an intensification in the system of production, even if it meant an overall decrease in efficiency. In other words, they needed more calories even if they were working harder to get them.

The idea that the hunter-gatherer works less (or "works" at all) than the farmer is likely one of the hardest concepts to believe in this section. Anthropological studies over the last fifty years have confirmed it, but it is simply hard for us to discard a lifetime of caveman images that our culture provides us with in books, movies, songs, and even jokes.

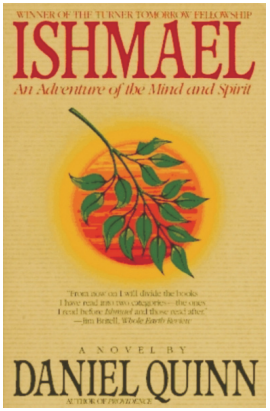
A helpful metaphor might be when you are in high school and you have a job. It might be an occasional but very well-paid job, like giving after-school tutoring to younger students; let's say this pays $10 an hour. When you move out into your own apartment and have to support yourself, you need more money, so you have to get a waitering job. It pays only half of the tutoring but you get a lot more hours, so in the end, even though you are working harder for it, you have more money. It may come as a surprise, but the average hunter-gatherer, to get his 2000 daily calories, expends about 500 calories, whereas an agriculturalist "spends" about 1200. Think about all the work one puts into a garden: tilling, planting, watering, pruning, hoeing, weeding, etc. … and we haven't arrived at harvest yet. Now imagine you could just walk by your neighbors garden and pick whatever you wanted for free. Wild edibles don't taste as good as tomatoes, perhaps, and grass-fed beef is less chewy than deer meat, but it takes a lot fewer calories to obtain them.

The economics of hunter-gatherer systems were only understood in the late sixties with the publication of Marshall Sahlins' landmark book *Stone Age Economics*. Sahlins' rigorous data-gathering among the Kalahari Bushmen led to this breakthrough in understanding how very disadvantaged agriculturalists are. An excellent recent book on hunter-gatherer economics, John Gowdy's *Limited Wants, Unlimited Means*, updates Sahlins' thesis with research from many other studies that have been conducted since.

Agriculture and The Origin of Thugs

In any event, our hunter-gatherer ancestors in a number of different places in the world reached the point where they needed to intensify their food production. Unfortunately, as Jared Diamond explains in his Pulitzer Prize-winning book, *Guns, Germs, and Steel*, most areas of the world did not have enough species suitable for domestication to form an agricultural "suite." Hunter-gatherers could not just domesticate, say, wheat, and then transition to being farmers. First they needed a reason to do so, as the hunter-gatherer lifestyle is a lot less difficult. Population expansion and resource depletion gave them the stone-age equivalent of layoffs and inflation. However, they then needed several domesticated food crops (and animals) to be able to make the transition.

In the areas where these suites were available, agriculture began. We are most familiar with that of the fertile crescent, where many of our common grains (wheat, barley, rye) were domesticated, along with legumes, a number of fruits and helpful animals. This excellent suite allowed those farmers to produce surpluses, which in turn nurtured the growth of civilization and the differentiation of work, as well as the locking up food, which fostered the rise of elites. Where there is agriculture, you find social stratification. This is an important point, as we often are lulled into thinking that if only we could all be yeoman farmers, life would be simpler and more just. The reality has almost



Ishmael
Daniel Quinn

This is an absolutely fundamental book for understanding our predicament and how it arose from the ecological limits on hunting and gathering.

always been that farmers make surplus food and the big man with the thugs locks it up. In our modern world the "thugs" may be bureaucrats and judges rather than guards, but the idea is the same: access to food is controlled by coercive force.

And this is how it went for a long time. Farmers spread, either because they needed to turn more forest into cropland to feed the new little farmers or because the men with the hired thugs wanted more money in the treasury. Empires rose and fell (falling partially because of exhaustion of the land they worked), and farmers spread everywhere. Note that the hunter-gatherers resisted strenuously at every instance of encroachment. We are used to thinking of agriculture as a blessing and agricultural civilization as one of man's best inventions – so why did the savages resist?

Probably because they saw how difficult the farmers had to work to get their food, how their health was poor (much worse than hunter-gatherers living on a balanced diet), and how their society was incredibly stratified. In the *Bible* God cast Adam and Eve out of the Garden of Eden, where they had essentially been hunter-gatherers; their punishment was to become… farmers. They could no longer collect food freely but hadto earn it with the sweat of their brows. Daniel Quinn, the author of *Ishmael*, puts this story in context as part of early Semitic hunter-gatherer propaganda against their farmer rivals. When they were conquered by the spreading and murderous farmers (here is the Cain and Able parable), the Hebrews retained this story in their

religious canon, even though they had become farmers themselves. More food production (from agriculture) meant more farmers, and more farmers needed still more land for food production, hence the continual expansion of farmers into hunter-gatherer zones. There were always more farmers than hunters, and the farmers' surplus could sustain an army in the field as well as pay for weapons, so agriculture spread.

We are used to thinking of the industrial revolution as a distinct break with the past, and we think in terms of agricultural societies and industrial societies. This is sort of like the thought that the U.S. and other technologically-advanced countries are no longer industrial but "information economies." This ignores the fact that all those computers and things we move around with them are still industrial products. We may not make as much steel in the U.S. but we are just as "industrial" as we used to be in our use of it—we just import it from somewhere else. False, too, is the idea that industrialization is some sort of a break with the agricultural past. Industry is simply an extension of agriculture, something allowed by the incredible productivity of fossil fuel-based industrial agriculture. The next time you fly in a plane, look down and compare the percent of land used for agriculture to that of land used for industry. We may have bigger and better toys, but we're still dependent on farmers to produce a surplus to keep the rest of us alive.

Wallerstein also points out that what we call "globalization" is a misnomer, in that capitalism has been a global affair for at least the last five hundred years. The shifting of production to zones where there is a lower labor cost and use of "free trade" hypocrisy to destroy competition in other countries is being intensified to combat the strain on profit-making.

Capitalism and Its Asymptotes

And then came capitalism. Capitalism is just another way of ordering the relations between the producers and the bosses, to a certain extent, as Karl Marx recognized. But it is quite a bit more than that, allowing joint stock corporations to push into every niche of social life. It is like a strain of antibiotic-resistant bacteria, in that it is so successful that it spreads everywhere. Capitalism allowed for industrialization on a large scale and even for a radical transformation of agriculture, moving it from a largely local issue to a global market. The problem with it is that, after five hundred years of capitalism, our economic system is running into a number of asymptotes that will create a crisis. These instances of diminishing marginal returns and their effects on capitalism have been identified and very well described by Immanuel Wallerstein, a sociologist who ignores the imaginary boundaries between economics and politics.

The first problem is the lack of another labor supply to proletarianize. Normally capitalism has sought the cheapest workers, pushing farther and farther into rural regions. Workers who have never had a wage job tend to be poorly educated and not well-organized, at least for several decades, but eventually they organize and demand higher wages, and the cost of production rises. The phenomenon of runaway factories is by no means new, but unfortunately capitalism has few opportunities now of new sources of unorganized labor. That great reserve, China, will not long remain unorganized.

Another problem is the use and abuse of natural resources. Capitalist copmanies have always been able to externalize costs by dumping waste and counting on easily extractable primary materials. The cost of dumping wastes has risen to the point where it is hurting capitalism's own function, and a strong environmentalist movement has forced companies to internalize at least some of these disposal costs, through environmental laws. These laws raise prices and put a pinch on profits, as do the exhaustion of high-quality resources. For example, high-grade copper ore was found in abundance in the Midwest region of the United States for years, but the use of this resource has led to the search for new sources, which are inevitably of lower grade and more difficult to extract.

Our most important primary resources are, of course, crude oil and various other fossil fuels, and the midpoint of their production is probably one of the most important of these examples of diminishing marginal returns. These three asymptotes are reducing profits, which lead to a slowdown of capitalism itself. It also means, indirectly, that less money is available for social programs, worldwide. Universal health care of some sort, education, and old-age pensions, as well as minimal involvement in decision-making through elections, were the crumbs that liberal governments have used to content the working classes in countries since the times of the enlightened conservatives, Benjamin Disraeli (in Britain) and Otto von Bismarck (in Germany).

These entitlements gave people hope that even if their lives weren't perfect, their children were better off. In part because of the beginning of the slowdown in capitalism, the mask of this false reality was torn off in the student revolts of 1968. Since then fewer and fewer people have believed that their lives will be better off than their parents'. Real wages, when adjusted for inflation, have been falling since the early 1970s all over the world and governments of all stripes have been cutting back on social programs, simply because they no longer have the money to fund them. Falling wages have meant more resistance (active and passive) against taxation, but in the context of a desire for the expansion of social programs.

So there we have it, the conjuncture of a number of different problems which in the end make it harder to put food on the table for everyone. The over-six-billion people on the face of the planet, in appropriating almost half of the solar energy that arrives to the surface as well as the solar energy of eons past in the form of fossil fuels, are stressing the system to its limits. Capitalism, with its accompanying abuse of the environment, is unable to magically transcend these limits. We have allowed our population to explode as the Green Revolution has allowed us to use dirt as a tool to turn oil into human flesh through increased food production.

I've taken millions of years of human development and squashed it into about nine pages, and doing so has necessitated a cursory treatment of many aspects. Those

who are interested in better understanding the predicament are encouraged to read Daniel Quinn's *Ishmael*, William Catton's *Overshoot* (a classic ecological text that discusses collapse), and Jared Diamond's *Guns, Germs, and Steel*. These texts suggest that the trajectory of our civilization is towards collapse. Peak Oil is simply the most recent, and perhaps last, serious squeeze on our ability to intensify food production in order to keep our numbers and our civilization growing.