THE DECLINE AND FALL OF SLOANISM

Kevin A. Carson

Center for a Stateless Society Paper No. 4 (August 2009)

Introduction

In the last C4SS paper, we saw that Sloanist mass production, as a system created by the state, diverted the course of industrial development for a century. In this one, we will see how the unsustainability of the Sloanist model will lead to a resumption of the original decentralist course of development.[1]

If you watch the mainstream cable news networks and news analysis programs, you've no doubt seen, many times, talking head commentators rolling their eyes at any proposal for reform that differs too radically from the existing institutional structure of society. That much of a departure would be completely unrealistic, they imply, not only because it is an arrogant imposition on the common sense regular folks who prefer things the way they are, but because “the way things are” is a natural state of affairs that came about by being the most efficient way of doing things.

But in fact the present system is, itself, radical. The corporate economy was created in a few decades as a radical departure from what prevailed before. And it did not come about by natural evolutionary means, or "just happen"; it's not just "the way things are." It was imposed from above (as we saw in Chapter One) by a conscious, deliberate, *radical* social engineering effort, with virtually no meaningful democratic input from below.

All social systems include social reproduction apparatuses, whose purpose is to produce a populace schooled to accept "the way things are" as the only possible world, and the only natural and inevitable way of doing things. So the present system, once established, included a cultural, ideological and educational apparatus (lower and higher education, the media, etc.) run by people with exactly the same ideology and the same managerial class background as those running the large corporations and government agencies.

All proposals for “reform” within the present system are designed to be implemented within existing institutional structures, by the sorts of people running the dominant institutions. Anything that fundamentally weakened or altered the present pattern of corporate-state domination, or required eliminating the power of the elites running the dominant institutions, would be—by definition—“too radical.”

The system of power can only be undermined by forces beyond its control. Fortunately, it faces a mutually reinforcing and snowballing series of terminal crises which render it unsustainable.

The present system's enculturation apparatus functions automatically to present it as inevitable, and to suppress any consciousness that “other worlds are possible.” But not only are other worlds possible —the terminal crises of the present system mean that *this* world, increasingly, is becoming *impossible*.

I. Babylon is Fallen

Resumption of the Crisis of Overaccumulation

1 This paper continues where C4SS Paper No. 3 (“Moloch: Mass-Production Industry as a Statist Construct” <http://c4ss.org/wp-content/uploads/2009/08/moloch.pdf>) left off. Both are developments of themes stated, more briefly, in C4SS Paper No. 1 (“Industrial Policy: New Wine in Old Bottles” <http://c4ss.org/wp-content/uploads/2009/01/industrialpolicycarson0109.pdf>).

Paul Baran and Paul Sweezy described the Great Depression as "the normal outcome of the workings of the American economic system." It was the culmination of the "stagnationist tendencies inherent in monopoly capitalism," and far from being a deviation from economic normality was "the realization in practice of the theoretical norm toward which the system is always tending."[2]

Fortunately for corporate capitalism, World War Two postponed the crises for a generation or so, by blowing up most of the plant and equipment in the world outside the United States. William Waddell and Norman Bodek, in *The Rebirth of American Industry*, describe the wide-open field left for the American mass-production model:

> General Motors, Ford, General Electric and the rest converted to war production and were kept busy, if not prosperous, for the next four years. When the war ended, they had vast, fully functional factories filled with machine tools. They also had plenty of cash, or at least a pocket full of government IOUs. More important, they also had the entire world market to themselves. The other emerging automobile makers, electric product innovators, consumer product companies, and machine tool builders of Europe and Asia were in ruins.[3]

The destruction of capital postponed the crisis of overaccumulation until around 1970, when the industrial capacity of Europe and Japan had been rebuilt. By that time, according to Piore and Sabel, American domestic markets for industrial goods had become saturated.[4]

According to Walden Bello, the capitalist state attempted to address the resumed crisis of overproduction with a long series of expedients—including a combination of neoliberal restructuring, globalization, the creation of the tech sector, the housing bubble and intensified suburbanization, and the expansion of the FIRE economy (finance, insurance and real estate)—as successive expedients to soak up surplus capital.[5]

Unfortunately for the state capitalists, the neoliberal model based on offshoring capital has reached its limit; China itself has become saturated with industrial capital.[6] The export-oriented industrialization model in Asia is hitting the walls of both Peak Oil and capital saturation. Bello points out that 75% of China's manufacturers were already complaining of excess capacity and demand stagnation, even before the bubble of debt-fueled demand collapsed.[7]

And today, as "goods pile up in wharves from Bangkok to Shanghai, and workers are laid off in

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2 Paul Baran and Paul Sweezy, *Monopoly Capitalism: An Essay in the American Economic and Social Order* (New York: Monthly Review Press, 1966), p. 240. Some free market advocates may bristle at my reliance on the overproduction theories of left-wing critics of capitalism. The free market, they no doubt indignantly point out, has no such tencencies toward overproduction, overinvestment, and underconsumption. But the tendencies that would prevail in a "free market" have little relevance to the tendencies of the real-world system we live in; this is not a free market. Stagnationist theories, ranging from the underconsumptionism of Keynes to the overaccumulation theories of the neo-Marxists, are in fact quite useful as explanatory models of actually existing corporate capitalism.

3 William H. Waddell and Norman Bodek, *Rebirth of American Industry: A Study of Lean Management* (Vancouver, WA: PCS Press, 2005), p. 94.

4 Michael J. Piore and Charles F. Sabel, *The Second Industrial Divide: Possibilities for Prosperity* (New York: HarperCollins, 1984), p. 184.

5 Walden Bello, "A Primer on Wall Street Meltdown," *MR Zine*, October 3, 2008 <http://mrzine.monthlyreview.org/bello031008.html>.

6 Walden Bello, "A Primer on Wall Street Meltdown," *MR Zine*, October 3, 2008 <http://mrzine.monthlyreview.org/bello031008.html>.

7 Walden Bello, "Can China Save the World from Depression?" *Counterpunch*, May 27, 2009 <http://www.counterpunch.org/bello05272009.html>.

record numbers, people in East Asia are beginning to realize they aren't only experiencing an economic downturn but living through the end of an era." The clear lesson is that the export-oriented industrial model is extremely vulnerable to both increased shipping costs and decreases in Western purchasing power—a lesson that has "banished all talk of decoupling" a growing Asian economy from the stagnating West. Asia's manufacturing sector is "linked to debt-financed, middle-class spending in the United States, which has collapsed."[8] The Asian export economy, as a result, has fallen through the floor.

> Worldwide, industrial production has ground to a halt. Goods are stacking up, but nobody's buying; the Washington Post reports that "the world is suddenly awash in almost everything: flat-panel televisions, bulldozers, Barbie dolls, strip malls, Burberry stores." A Hong Kong-based shipping broker told The Telegraph that his firm had "seen trade activity fall off a cliff. Asia-Europe is an unmitigated disaster." The Economist noted that one can now ship a container from China to Europe for free—you only need to pick up the fuel and handling costs—but half-empty freighters are the norm along the world's busiest shipping routes. Global airfreight dropped by almost a quarter in December alone; Giovanni Bisignani, who heads a shipping industry trade group, called the "free fall" in global cargo "unprecedented and shocking."[9]

Suburbanization, thanks to Peak Oil and the collapse of the housing bubble, has also ceased to be a viable outlet for surplus capital.

It was after the collapse of the tech bubble that financialization—the use of derivatives and securitized debt as surplus capital sponges to soak up investment capital for which no outlet existed in productive industry—really came into its own. As Joshua Holland noted, in most recessions the financial sector contracted along with the rest of the economy; but after the 2000 tech bust it just kept growing, ballooning up to ten percent of the economy.[10] We're seeing now how that worked out.

Financialization was a way of dealing with a surplus of productive capacity, whose output the population lacked sufficient purchasing power to absorb, because almost all increases in productivity had gone to increasing the wealth of the upper class. Financialization enabled the upper class to lend its increased wealth to the rest of the population, at interest, so they could buy the surplus output. But the housing asset bubble collapsed, government is unable to reinflate housing and other asset values even with trillion-dollar taxpayer bailouts, and an alarming portion of the population is no longer able to service the debts accumulated in "good times." Not only there are no inflated asset values to borrow against to fuel demand, but many former participants in the Ditech spending spree are now becoming unemployed or homeless in the Great Deleveraging.[11]

Besides, the problem with debt-inflated consumer demand was was that there was barely enough demand to keep the wheels running and absorb the full product of overbuilt industry even when everyone maxed out their credit cards and tapped into their home equity to replace everything they owned every five years. We'll never see that kind of demand again, obviously. So there's no getting around the fact that a major portion of existing plant and equipment will be rust in a few years.

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8 Walden Bello, "Asia: The Coming Fury," *Asia Times Online*, February 11, 2009 <http://www.atimes.com/atimes/Asian_Economy/KB11Dk01.html>.
9 Joshua Holland, "The Spectacular, Sudden Crash of the Global Economy," *Alternet*, February 24, 2009 <http://www.alternet.org/module/printversion/128412/the_spectacular%2C_sudden_crash_of_the_global_economy/>.
10 Joshua Holland, "Let the Banks Fail: Why a Few of the Financial Giants Should Crash," *Alternet*, December 15, 2008 <http://www.alternet.org/workplace/112166/let_the_banks_fail%3A_why_a_few_of_the_financial_giants_should_crash_/>.
11 Charles Hugh Smith, "Globalization and China: Neoliberal Capitalism's Last 'Fix'," *Of Two Minds*, June 29, 2009 <http://www.oftwominds.com/blogjune09/globalization06-09.html>.

State capitalism seems to be running out of safety valves. Barry Eichengreen and Kevin O'Rourke suggest that, given the scale of the decline in industrial output and global trade, the term "Great Recession" may well be over-optimistic. Graphing the rate of collapse in global industrial output and trade from Spring 2008 to Spring 2009, they found the current rate of decline has actually been steeper than that of 1929-1930. It is, in short, "a Depression-sized event," with the world "currently undergoing an economic shock every bit as big as the Great Depression shock of 1929-30."[12]

Left-Keynesian Paul Krugman speculated that the economy narrowly escaped another Great Depression in early 2009.

> A few months ago the possibility of falling into the abyss seemed all too real. The financial panic of late 2008 was as severe, in some ways, as the banking panic of the early 1930s, and for a while key economic indicators — world trade, world industrial production, even stock prices — were falling as fast as or faster than they did in 1929-30.
>
> But in the 1930s the trend lines just kept heading down. This time, the plunge appears to be ending after just one terrible year.
>
> So what saved us from a full replay of the Great Depression? The answer, almost surely, lies in the very different role played by government.
>
> Probably the most important aspect of the government's role in this crisis isn't what it has done, but what it hasn't done: unlike the private sector, the federal government hasn't slashed spending as its income has fallen.[13]

This is not to suggest that the Keynesian state is a desirable model. Rather, it is made necessary by state capitalism. But make no mistake: so long as we have state capitalism, with state promotion of overaccumulation and the maldistribution of purchasing power that results from privilege, state intervention to manage aggregate demand is necessary to avert depression. *Given* state capitalism, we have only two alternatives: 1) eliminate the privileges and subsidies to overaccumulation that result in chronic crisis tendencies; or 2) resort to Keynesianism, Social Credit, or something else of that sort.

And we should bear in mind that it's far from clear the worst has, in fact, been averted. Karl Denninger argues that the main reason GDP fell only 1% in the second quarter of 2009, as opposed to 6% in the first, was increased government spending. As he points out, the fall of investment slowed in the second quarter; but given that it was already cut almost in half, there wasn't much further it *could* fall. Exports fell "only" 7% and imports 15.1%; but considering they had already fallen 29.9% and 36.4%, respectively, in the first quarter, this simply means that exports and imports have "collapsed." Consumer spending fell in the second quarter more than in the first, with a second quarter increase in the rate of "savings" (or rather, of paying down debt). Denninger's take: "The recession is not 'easing', it is DEEPENING."[14]

In any case, if Keynesianism is *necessary* for the survival of state capitalism, we're reaching a point at which it is no longer *sufficient*. If pessimists like Denninger are wrong, and Keynesian policies

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12 Barry Eichengreen and Kevin H. O'Rourke, "A Tale of Two Depressions," *VoxEU.Org*, June 4, 2009 <http://www.voxeu.org/index.php?q=node/3421>.
13 Paul Krugman, "Averting the Worst," *New York Times*, August 9, 2009 <http://www.nytimes.com/2009/08/10/opinion/10krugman.html>.
14 Karl Denninger, "GDP: Uuuuggghhhh – UPDATED," *The Market Ticker*, July 31, 2009 <http://market-ticker.denninger.net/archives/1276-GDP-Uuuuggghhhh.html>.

have indeed turned the free fall into a slow motion collapse, the fact remains that they are insufficient to restore "normalcy"—because normalcy is no longer an option. Keynesianism was sufficient during the postwar "Consensus Capitalism" period because of the worldwide destruction of plant and equipment in WWII, which postponed the crisis of overaccumulation for a generation or so.

Bello makes the very good point that Keynesianism is not a long-term solution to the present economic difficulties because it ceased to be a solution the first time around.

> The Keynesian-inspired activist capitalist state that emerged in the post-World War II period seemed, for a time, to surmount the crisis of overproduction with its regime of relatively high wages and technocratic management of capital-labor relations. However, with the addition of massive new capacity from Japan, Germany, and the newly industrializing countries in the 1960s and 1970s, its ability to do this began to falter. The resulting stagflation — the coincidence of stagnation and inflation — swept throughout the industrialized world in the late 1970s.[15]

Conventional left-Keynesian economists are at a loss to imagine some basis on which a post-bubble economy can ever be reestablished with anything like current levels of output and employment. This is especially unfortunate, given the focus of both the Bush and Obama administrations' banking policies on restoring asset prices to something approaching their pre-collapse value, and the focus of their economic policies on at least partially reinflating the bubble economy as a source of purchasing power, so that—as James Kunstler so eloquently puts it—

> the US public could resume a revolving credit way-of-life within an economy dedicated to building more suburban houses and selling all the needed accessories from supersized "family" cars to cappuccino machines. This would keep everyone employed at the jobs they were qualified for—finish carpenters, realtors, pool installers, mortgage brokers, advertising account executives, Williams-Sonoma product demonstrators, showroom sales agents, doctors of liposuction, and so on.[16]

The problem is that pre-collapse levels of output can only be absorbed by debt-financed and bubble-inflated purchasing power, and another bubble on the scale of the tech and real estate booms just ain't happening.[17]

Keynesianism might be viable as a long-term strategy if deficit stimulus spending were merely a way of bridging the demand shortfall until consumer spending could be restored to normal levels, after which it would use tax revenues in good times to pay down the public debt. But if normal levels of consumer spending *won't* come back, it amounts to the U.S. government borrowing $2 trillion this year to shore up consumer spending *for this year*—with consumer spending falling back to Depression levels next year if *another* $2 trillion isn't spent. So capitalism might be sustainable, in terms of the demand shortfall taken in isolation—*if* the state is prepared to run a deficit of $2 trillion a year

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15 Walden Bello, "Keynes: A Man for This Season?" *Share the World's Resources*, July 9, 2009 <http://www.stwr.org/globalization/keynes-a-man-for-this-season.html>.

16 James Kunstler, "Note: Hope = Truth," *Clusterfuck Nation*, April 20, 2009 <http://jameshowardkunstler.typepad.com/clusterfuck_nation/2009/04/note-hope-truth.html>.

17 Michael Hudson, "What Wall Street Wants," *Counterpunch*, February 11, 2009 <http://www.counterpunch.org/hudson02112009.html> (see also expanded version, "Obama's Awful Financial Recovery Plan," *Counterpunch*, February 12, 2009 <http://www.counterpunch.org/hudson02122009.html>). Both the Paulson and Geithner TARP plans involve the same kind of Hamiltonian skullduggery: borrowing money, to be repaid by taxpayers with interest, to purchase bad assets from banks at something much closer to face value than current market value, to increase the liquidity of banks to the point that they may lend money back to the public—should they deign to do so—at interest. Or as Hudson put it, TARP "aims at putting in place enough new bank-lending capacity to start inflating prices on credit all over again."

indefinitely. The problem is, there will never again be a tax base capable of paying for these outlays, because (as we shall see below) the implosion of production costs from digital production and small-scale manufacturing technology is *destroying* the tax base.

It might be possible to sustain such spending on a permanent basis via something like the "Social Credit" proposals of Major Douglas some eighty years ago (simply creating the money out of thin air instead of borrowing it or funding it with taxes, and depositing so much additional purchasing power interest-free in every citizen's checking account each month). But that would undermine the basic logic of capitalism, removing the incentive to accept wage labor on the terms offered, and freeing millions of people to retire on a subsistence income from the state while participating in the non-monetized gift or peer economy. What's more, it would be a disaster on the scale Christian theologians attribute to the possibility that Adam and Eve might have eaten the fruit of the Tree of Life in their fallen state: it would enable the present model of mass-production capitalism, based on push distribution and planned obsolescence, to keep right on indefinitely—running at full capacity to produce goods for the landfill—until it consumed the biosphere.

Those who leaven their Keynesianism with some degree of "green" sensibility have a hard time reconciling the fundamental contradiction involved in the two sides of modern "Progressivism." Paul Krugman is a good case in point:

> I'm fairly optimistic about 2010.
>
> But what comes after that? Right now everyone is talking about, say, two years of economic stimulus — which makes sense as a planning horizon. Too much of the economic commentary I've been reading seems to assume, however, that that's really all we'll need — that once a burst of deficit spending turns the economy around we can quickly go back to business as usual.
>
> In fact, however, things can't just go back to the way they were before the current crisis. And I hope the Obama people understand that.
>
> The prosperity of a few years ago, such as it was — profits were terrific, wages not so much — depended on a huge bubble in housing, which replaced an earlier huge bubble in stocks. And since the housing bubble isn't coming back, the spending that sustained the economy in the pre-crisis years isn't coming back either.
>
> To be more specific: the severe housing slump we're experiencing now will end eventually, but the immense Bush-era housing boom won't be repeated. Consumers will eventually regain some of their confidence, but they won't spend the way they did in 2005-2007, when many people were using their houses as ATMs, and the savings rate dropped nearly to zero.
>
> So what will support the economy if cautious consumers and humbled homebuilders aren't up to the job?[18]

(I would add that, whatever kind of post-bubble "normalcy" we're restored to, in the age of Peak Oil and absent previous pathological levels of consumer credit, it's unlikely the U.S. will ever seen a return to automobile sales of 18 million a year. If anything, the current output of ten million cars is probably far above sustainable levels.)

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18 Paul Krugman, "Life Without Bubbles," *New York Times*, January 6, 2009 <http://www.nytimes.com/2008/12/22/opinion/22krugman.html?ref=opinion>.

And Krugman himself, it seems, is not entirely immune to the belief that a sufficient Keynesian stimulus will restore the levels of consumer demand associated with something like "normalcy." Krugman first compares the longer duration and greater severity of depressions without countercyclical government policy to those with, and then cites Keynes as an authority in estimating the length of the current Great Recession without countercyclical stimulus spending: "a recession would have to go on until 'the shortage of capital through use, decay and obsolescence causes a sufficiently obvious scarcity to increase the marginal efficiency.'"[19]

But as he himself suggested in his earlier column, the post-stimulus economy may have much lower "normal" levels of demand than the pre-recession economy, in which case the only effect of the stimulus will be to pump up artificial levels of demand so long as the money is still being spent. In that case, as John Robb suggests, the economy will settle into a new equilibrium with levels of demand set at much lower levels.

> The assumption is that new homes will eventually need to be built to accommodate population growth and new cars will be sold to replace old stock. However, what if there is a surge in multi-generational housing (there is) or people start to drive much less (they are) or keep their cars until they drop (most people I know are planning this). If that occurs, you have to revise the replacement level assumption to a far lower level than before the start of the downturn. What's that level? I suspect it is well below current sales levels, which means that there is much more downside movement possible.[20]

The truth of the matter is, the present economic crisis is not cyclical, but structural. There is excess industrial capacity that will be rust in a few years because we are entering a period of *permanently* low consumer demand. As Peter Kirwan at *Wired* puts it, the mainstream talking heads are mistaking for a cyclical downturn what is really "permanent structural change" and "industrial collapse."[21]

While Krugman lamely fiddles around with things like a reduction of the U.S. trade deficit as a possible solution to the demand shortfall, liberal blogger Matthew Yglesias has a more realistic idea of what a sustainable post-bubble economy might actually entail.

> I would say that part of the answer may well involve taking a larger share of our productivity gains as increased leisure rather than increased production and incomes.... A structural shift to less-work, less-output dynamic could be catastrophic if that means a structural shift to a very high rate of unemployment. But if it means a structural shift toward six-week vacations and fewer 60 hour weeks then that could be a good thing.[22]

Exactly. But a better way of stating it would be "a structural shift toward a less-work, less-output, less-planned-obsolescence, and less-embedded-rents-on-IP-and-ephemera dynamic, with no reduction in material standard of living. A structural dynamic toward working fewer hours to produce less stuff because it lasts longer instead of going to the landfill after a brief detour in our living rooms, would indeed be a good thing.

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19 Paul Krugman, "Use, Delay, and Obsolescence," *The Conscience of a Liberal*, February 13, 2009 <http://krugman.blogs.nytimes.com/2009/02/13/use-delay-and-obsolescence/>.
20 John Robb, "Below Replacement Level," *Global Guerrillas*, February 20, 2009 <http://globalguerrillas.typepad.com/johnrobb/2009/02/below-replacement-level.html>.
21 Peter Kirwan, "Bad News: What if the money's not coming back?" *Wired.Co.Uk*, August 7, 2009 <http://www.wired.co.uk/news/archive/2009-08/07/bad-news-what-if-the-money%27s-not-coming-back.aspx>.
22 Matthew Yglesias, "The Elusive Post-Bubble Economy," *Yglesias/ThinkProgress.Org*, December 22, 2008 <http://yglesias.thinkprogress.org/archives/2008/12/the_elusive_post_bubble_economy.php>.

Michel Bauwens ventures a somewhat parallel analysis from a different perspective, that of Kondratiev's long-wave theory. According to Bauwens, 1929 was the sudden systemic shock of the last system, and from it emerged the present system, based on Fordist mass-production and the New Deal/organized labor social contract, the automobile, cheap fossil fuels—you know the drill. The system's golden age lasted from WWII to the early 1970s, when its own series of systemic shocks began: the oil embargo, the saturation of world industrial capital, and all the other systemic crises we're considering in this chapter. According to Bauwens, each long wave is characterized by a new energy source, a handful of technological innovations (what the neo-Marxists would call "epoch-making industries"), a new mode of financial system, and a new social contract. Especially interesting, each long wave presents "a new 'hyperproductive' way to 'exploit the territory,'" which parallels his analysis (which we will examine in later chapters) of the manorial economy as a path of intensive development when the slave economy reached its limits of expansion, and of netarchical capitalism as a way to extract value intensively when extensive addition of capital inputs is no longer feasible.

According to Bauwens, the emerging long wave will be characterized by renewable energy and green technology, distributed p2p credit and microlending, relocalized networked manufacturing, a version of small-scale organic agriculture that applies the latest findings of biological science, and a mode of economic organization centered on civil society and peer networks.[23]

However, to the extent that the capture of value through "intellectual property" is no longer feasible (see below), it seems unlikely that any such new paradigm can function on anything resembling the current corporate capitalist model.

Resource crises (Peak Oil)

Since the beginning of American industrialization, government policy has focused on providing cheap, abundant energy to the corporate economy. Wal-Mart's supply chains, suburbanization, and all the rest of it have floated on a sea of cheap oil from Texas, Oklahoma, and Saudi Arabia. This policy is now reaching its limits.

The basic idea of Peak Oil is that the rate of extraction of petroleum has peaked, or is about to peak. On the downside of the peak, the supply of oil will gradually contract year by year. Although the total amount of oil reserves remaining in the ground may be roughly comparable to those extracted to date, they will be poorer in quality, and more expensive (in both dollar terms and energy) to extract.

All the panaceas commonly put forth for Peak Oil—oil shale, tar sands, offshore drilling—turn out to be pipe dreams. The issue isn't the absolute amount of oil in offshore reserves or tar sands, but the *cost* of extracting them and the maximum feasible *rate* of extraction. In terms of the net energy surplus left over after the energy cost of extraction (Energy Return on Energy Investment, or EROEI), all the "drill baby drill" gimmicks are far more costly—cost far more BTUs per net BTU of energy produced—than did petroleum in the "good old days." The maximum rate of extraction from all the newly discovered offshore oil bonanzas the press reports, and from unconventional sources like tar sands, doesn't begin to compensate for the daily output of old wells in places like the Persian Gulf that will go offline in the next few years. And the oil from such sources is far more costly to extract, with much less net energy surplus.[24] The more boosterish advocates of alternatives like algae also greatly

23 Michel Bauwens, "Conditions for the Next Long Wave," *P2P Foundation Blog*, May 28, 2009 <http://blog.p2pfoundation.net/conditions-for-the-next-long-wave/2009/05/28>.
24 Rob Hopkins, *The Transition Handbook: From Oil Dependency to Local Resilience* (Totnes: Green Books, 2008), p.

exaggerate the EROEI and underestimate cost of productio0n of their favored alternative.[25]

Peak Oil skeptics frequently argue that a price spike like the one in 2008 is caused, not by Peak Oil, but "instead" by some special circumstance like a specific supply disruption or speculative bubble. But that misses the point.

The very fact that supply has reached its peak, and that price is entirely determined by the amount of demand bidding for a fixed supply, means that the price of oil is governed by the same speculative boom-bust cycle Henry George observed in land. Given the prospect of a fixed supply of land or oil, the rational interest of the oil industry, like that of real estate speculators, will lead them to hold greater or lesser quantities off the market, or dump them on the market, based on their estimate of the future movement of price. Hence the inconvenient fact, during the "drill here drill now" fever of the McCain-Palin campaign, that the oil companies were already sitting on large offshore oil reserves that they were failing to develop in anticipation of higher prices. And given the prospect of fixed supplies of oil, the greater the anticipated future scarcity value of oil, the greater the rational incentive for terrorists to leverage their power by disrupting supply. The infrastructure for extracting and distributing oil is unprecedentedly fragile, precisely because of a decline in productive capacity. Between 1985 and 2001, OPEC's excess production capacity fell from 25% of global demand to 2%. In 2003, the International Energy Agency estimated available excess capacity was at its lowest level in thirty years.[26]

According to Jeff Vail, speculative hoarding of petroleum and terrorist actions against oil pipelines are not *alternative* explanations *in place of* Peak Oil, but the results of a positive feedback process created by Peak Oil itself.

> It is quite common to hear "experts" explain that the current tight oil markets are due to "above-ground factors," and not a result of a global peaking in oil production. It seems more likely that it is geological peaking that is driving the geopolitical events that constitute the most significant "above-ground factors" such as the chaos in Iraq and Nigeria, the nationalization in Venezuela and Bolivia, etc. Geological peaking spawns positive feedback loops within the geopolitical system. Critically, these loops are not separable from the geological events—they are part of the broader "system" of Peak Oil.
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> Existing peaking models are based on the logistics curves demonstrated by past peaking in individual fields or oil producing regions. Global peaking is an entirely different phenomenon—the geology behind the logistics curves is the same, but global peaking will create far greater geopolitical side-effects, even in regions with stable or rising oil production. As a result, these geopolitical side-effects of peaking global production will accelerate the rate of production decline, as well as increase the impact of that production decline by simultaneously increasing marginal demand pressures. The result: the right side of the global oil production curve will not look like the left…whatever logistics curve is fit to the left side of the curve (where historical production increased), actual declines in the future will be sharper than that curve would predict.

Another positive feedback loop is that oil-exporting states will divert increasing shares of their currently exported surpluses into internal economic development. Control of oil reserves will become a primary goal of foreign policy, and states capable of securing control of oil reserves will give preferential access to their own economic needs.[27]

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25 "Has the Algae Cavalry Arrived?" *The Oil Drum*, May 11, 2007 <http://www.theoildrum.com/node/2531>.

26 Richard Heinberg, *Powerdown* (Gabriola Island, British Columbia: New Society Publishers, 2004), pp. 27-28.

27 Jeff Vail, "Five Geopolitical Feedback-Loops in Peak Oil," *JeffVail.Net*, April 23, 2007 <http://www.jeffvail.net/2007/04/five-geopolitical-feedback-loops-in.html>.

And the evidence is clear that price really is governed entirely by the fluctuation of demand, and that supply—at least on the upward side—is extremely inelastic. Just consider the movement of oil supplies after the price shock of the late '70s and early eighties with that of the past few years. As "transition town" movement founder Rob Hopkins points out, the supply of oil has increased little if any since 2005—fluctuating between 84 and 87 mbd—despite record price levels.[28]

Peak Oil is likely to throw a monkey-wrench into the gears of the Chinese model of state-sponsored capitalism. China heavily subsidizes energy and transportation inputs, pricing them at artificially low levels to domestic industrial consumers, just as did the USSR. This accounting gimmick won't work externally—the Saudis want cash on the barrel head, at the price they set for crude petroleum—and the increased demand for subsidized energy inputs by wasteful domestic Chinese producers will just cause China to bankrupt itself buying oil abroad.

Overall, the effect of Peak Oil is likely to be a radical shortening of corporate supply and distribution chains, a resurrection of small-scale local manufacturing in the United States, and a reorientation of existing manufacturing facilities in China and other offshore havens toward production for their own domestic markets.

This was a common theme during the oil shocks of the 1970s, and has been revived in the past few years. During the oil shock of the late '70s and early '80s, Warren Johnson predicted (somewhat prematurely) that rising fuel costs would lead to a relocalized economy with decentralized industry.[29]

The same theme has resurfaced with the current interest in Peak Oil. James Kunstler's collapse scenarios lie close to the most catastrophic end of the spectrum.[30] Brian Kaller's more sanguine expectation is of a controlled descent to a world in which per capita energy consumption is about a third of present levels, and airline traffic had shrunk by about 90%—in other words roughly the same metrics that prevailed in the 1950s "Mayberry" that Kaller holds up as a model for post-Peak Oil quality of life.[31] Like Kaller, Jeff Rubin presents the world after Peak Oil as largely "a return to the past ... in terms of the re-emergence of local economies."[32]

Assuming Peak Oil isn't reinforced by a "perfect storm" of other crises, like desertification from climate change, I think the truth lies closer to the Kaller/Rubin end of the spectrum. Demand is a lot more plastic than Kunstler imagines.

Despite the differences in relative optimism or pessimism among these various Peak Oil thinkers, their analyses all have a common thread running through them: the radical shortening of industrial supply and distribution chains, and an end to globalization based on the export of industry to low-wage sweatshop havens like China.

To quote a Rubin article from May 2008, two months before oil prices peaked, rising transportation costs had more than offset the Chinese wage differential. The cost of shipping a standard 40-ft

28 Hopkins, *The Transition Handbook*, p. 22.
29 Warren Johnson, *Muddling Toward Frugality: A Blueprint for Survival in the 1980s* (San Francisco: Sierra Club Books, 1978).
30 See *Clusterfuck Nation* blog <http://jameshowardkunstler.typepad.com/>.
31 Brian Kaller, "Future Perfect: Stop Worrying and Learn to Love Expensive Oil," *American Conservative*, August 25, 2008.
32 David Parkinson, "A coming world that's 'a whole lot smaller,'" *The Globe and Mail*, May 19, 2009 <http://docs.google.com/Doc?id=dg5dgmrv_79hjb66vc3>.

container, he wrote, had tripled since 2000, and could be expected to double again as oil prices approached $200/barrel.[33] What's more, "the explosion in global transport costs has effectively offset all the trade liberalization efforts of the last three decades." A rise in oil prices from $20 to $150/barrel has the same effect on international trade as an increase in tariffs from 3% to 11%—i.e., to their average level in the 1970s.[34] According to Richard Milne,

> Manufacturers are abandoning global supply chains for regional ones in a big shift brought about by the financial crisis and climate change concerns, according to executives and analysts.
>
> Companies are increasingly looking closer to home for their components, meaning that for their US or European operations they are more likely to use Mexico and eastern Europe than China, as previously.[35]

Fiscal Crisis of the State

The origins of corporate capitalism and the mass-production economy are associated with massive government subsidies; since then the tendency of corporate capital to socialize its operating costs has never abated. As a matter of basic economics, whenever you subsidize something and make it available to the user for less than its real cost, demand for it will increase. American capitalism, as a result, has followed a pattern of expansion skewed toward extensive additions of subsidized inputs, rather than more intensive use of existing ones. As James O'Connor describes the process,

> Transportation costs and hence the fiscal burden on the state are not only high but also continuously rising. It has become a standard complaint that the expansion of road transport facilities intensifies traffic congestion. The basic reason is that motor vehicle use is subsidized and thus the growth of the freeway and highway systems leads to an increase in the demand for their use.[36]
>
> There is another reason to expect transportation needs (and budgets) to expand. The development of rapid transport and the modernization of the railroads, together with the extension of the railroad systems, will push the suburbs out even further from urban centers, putting still more distance between places of work, residence, and recreation. Far from contributing to an environment that will free suburbanites from congestion and pollution, rapid transit will, no doubt, extend the traffic jams and air pollution to the present perimeters of the suburbs, thus requiring still more freeway construction, which will boost automobile sales.[37]

And the tendency of monopoly capitalism to generate surplus capital and output also increases the amount of money that the state must spend to absorb the surplus.

Monopoly capitalism, according to O'Connor, is therefore plagued by a "fiscal crisis of the state." "...[T]he socialization of the costs of social investment and social consumption capital increases over time and increasingly is needed for profitable accumulation by monopoly capital."[38]

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33 Jeffrey Rubin, "The New Inflation," *StrategEcon* (CIBC World Markets), May 27, 2008 <http://research.cibcwm.com/economic_public/download/smay08pdf>.
34 Jeffrey Rubin and Benjamin Tal, "Will Soaring Transport Costs Reverse Globalization?" *StrategEcon*, May 27, 2008, p. 4.
35 Richard Milne, "Crisis and climate force supply chain shift," *Financial Times*, August 9, 2009 <http://www.ft.com/cms/s/0/65a709ec-850b-11de-9a64-00144feabdc0.html>.
36 James O'Connor, *Fiscal Crisis of the State* (New York: St. Martin's Press, 1973), p. 106.
37 Ibid., pp. 109-110.
38 Ibid., p. 8.

> ...[A]lthough the state has socialized more and more capital costs, the social surplus (including profits) continues to be appropriated privately.... The socialization of costs and the private appropriation of profits creates a fiscal crisis, or "structural gap," between state expenditures and state revenues. The result is a tendency for state expenditures to increase more rapidly than the means of financing them.[39]

In short, the state is bankrupting itself providing subsidized inputs to big business, while big business's demand for subsidized inputs increases faster than the state can provide them. As Ivan Illich put it,

> queues will sooner or later stop the operation of any system that produces needs faster than the corresponding commodity....[40]

> ...[Institutions] create needs faster than they can create satisfaction, and in the process of trying to meet the needs they generate, they consume the Earth.[41]

The distortion of the price system, which in a free market would tie quantity demanded to quantity supplied, leads to ever-increasing demands on state services. Normally price functions as a form of feedback, a homeostatic mechanism much like a thermostat. Putting a candle under a thermostat will result in an ice-cold house. Likewise, when the consumption of some factor is subsidized by the state, the consumer is protected from the real cost of providing it, and unable to make a rational decision about how much to use. So the state capitalist sector tends to add factor inputs extensively, rather than intensively; that is, it uses the factors in larger amounts, rather than using existing amounts more efficiently. The state capitalist system generates demands for new inputs from the state geometrically, while the state's ability to provide new inputs increases only arithmetically. The result is a process of snowballing irrationality, in which the state's interventions further destabilize the system, requiring yet further state intervention, until the system's requirements for stabilizing inputs finally exceed the state's resources. At that point, the state capitalist system reaches a breaking point.

Eventually, therefore, state capitalism hits a wall at which the state is no longer able to increase the supply of subsidized inputs. States approach the condition described by John Robb's term "hollow state":

> The hollow state has the trappings of a modern nation-state ("leaders", membership in international organizations, regulations, laws, and a bureaucracy) but it lacks any of the legitimacy, services, and control of its historical counter-part. It is merely a shell that has some influence over the spoils of the economy.[42]

> ...A hollow state is different from a failed state in that it continues to exist on the international stage. It has all the standard edifices of governance although most are heavily corrupted and in thrall to global corporate/monied elites. It continues to deliver political goods (albeit to a vastly diminished group, usually around the capital) and maintains a military. Further, in sections of the country, there is an appearance of normal life.

> However, despite this facade, the hollow state has abdicated (either explicitly as in Lebanon's case or de facto as in Mexico's) vast sections of its territory to networked tribes (global guerrillas). Often, these groups maintain a semblance of order, as in rules of Sao Paulo's militias or the Taliban's application of sharia.

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39 Ibid., p. 9.
40 Illich, *Disabling Professions* (New York and London: Marion Boyars, 1977), p. 30.
41 Illich, *Deschooling Society* (New York, Evanston, San Francisco, London: Harper & Row, Publishers, 1970, 1971), pp. 109-110.
42 John Robb, "Onward to a Hollow State," *Global Guerrillas*, September 22, 2009 <http://globalguerrillas.typepad.com/globalguerrillas/2008/09/onward-to-a-hol.html>.

> Despite the fact that these group control/manipulate explicit economic activity and dominate the use/application of violence at the local level, these groups often grow the local economy. How? By directly connecting it to global supply chains of illegal goods—from people smuggling to drugs to arms to copytheft to money laundering.
>
> The longer this state of affairs persists, the more difficult it is to eradicate. The slate of alternative political goods delivered by these non-state groups, in contrast to the ineffectiveness of the central government, sets the stage for a shift in legitimacy. Loyalties shift. Either explicitly through membership in tribal networks, or acknowledgement of the primacy of these networks over daily life.[43]

The entente between the American and Iraqi government forces, on the one hand, and the Sunni militias in Al Anbar province, on the other, is a recent example of a hollowed state coming to terms with "Fourth Generation Warfare" networks as de facto local governments. An early example was the Roman imperial state of the fifth century, delegating de facto territorial control to German tribal entities giving de jure fealty to Rome.

If the state does not become completely hollowed out by Robb's criteria, it nevertheless is forced to retreat from an ever increasing share of its former functions owing to its shrinking resources: a collapse of the value of official currency, combined with a catastrophic decline in tax revenues. The state delegates more and more functions to private entities nominally operating pursuant to state policy but primarily in the interest of self-aggrandizement, becomes prey to kleptocrats, leaves unenforced more and more laws that are technically on the books, and abandons ever increasing portions of its territory to the black market and organized criminal gangs.

In many ways, this is a positive development. Local sheriffs may decide that evicting mortgage defaulters and squatters, enforcing regulatory codes against household microenterprises, and busting drug users fall very low on their list of priorities, compared to dealing with murder and robbery. Governments may find themselves without the means of financing corporate welfare. But to the extent that current economic structure is heavily dependent on government activity, and adjustment to the withdrawal of subsidized infrastructure and services may take time, an abrupt retreat of state activity may result in a catastrophic period of adjustment.

The fiscal crisis dovetails with Peak Oil and other resource crises, in a mutually reinforcing manner. The imperative of securing strategic access to world petroleum reserves, and keeping the sea lanes open, results in costly foreign wars. The increased cost of asphalt intensifies an already existing tendency, of demand for subsidized transportation infrastructure outstripping the state's ability to supply it. As the gap expands, the period between deterioration of roads and the appropriation of money to repair them lengthens. The number of miles of high-volume highway the state is able to keep in a reasonable state of repair falls from one year to the next, and the state is continually forced to retreat and regroup and relegate an ever-larger share of highways to second-tier status. As James Kunstler points out, a highway is either kept in repair, or it quickly deteriorates.

> Another consequence of the debt problem is that we won't be able to maintain the network of gold-plated highways and lesser roads that was as necessary as the cars themselves to make the motoring system work. The trouble is you have to keep gold-plating it, year after year. Traffic engineers refer to this as "level-of-service." They've learned that if the level-of-service is less than immaculate, the highways quickly enter a spiral of disintegration. In fact, the American Society of Civil Engineers reported several years ago that the condition of many highway bridges and tunnels was at the "D-minus" level, so we had already fallen far

43 Robb, "HOLLOW STATES vs. FAILED STATES," *Global Guerrillas*, March 24, 2009 <http://globalguerrillas.typepad.com/globalguerrillas/2009/03/hollow-states-vs-failed-states.html>.

> behind on a highway system that had simply grown too large to fix even when we thought we were wealthy enough to keep up.[44]

It doesn't take many years of neglect before deterioration and axle-breaking potholes render a highway unusable to heavy trucks, so that a growing share of the highway network will for all intents and purposes be abandoned.[45]

Decay of the Cultural Pseudomorph

What Mumford called the "cultural pseudomorph," as we saw it described in the previous paper, was actually only the first stage. It has since decayed into a second, much weaker stage, unforeseen by Mumford, and shows signs of its final downfall. In the first stage, as Mumford observed, neotechnic methods (i.e., electrically powered machinery) were integrated into a mass-production framework fundamentally opposed to the the technology's real potential. But this stage reached its limit by the 1970s.

In the second stage, mass production on the Taylor-Sloan model is being replaced by flexible, networked production with general-purpose machinery, with the production process organized along lines much closer to the original neotechnic ideal.

Piore and Sabel describe the "lean" revolution of recent decades as the discovery, after a long interlude of mass production, of the proper way of organizing an industrial economy. "[T]he mass-production paradigm had unforeseen consequences: it took almost a century (from about 1870 to 1960) to discover how to organize an economy to reap the benefits of the new technology."[46]

According to those authors, the shift to lean production in America from the 1980s on was in large part a response to the increasing environment of macroeconomic uncertainty that prevailed after the resumption of the crisis of overaccumulation, and the oil shocks of the '70s. Mass-production industry is extremely brittle—i.e., it "does not adjust easily to major changes in its environment." The question is not just how industry will react to resource depletion, but how it will react to wildly fluctuating prices and erratic supplies.[47] As we have seen, long-term capital investment in costly technologies requires predictability; and the environment associated with Peak Oil and other input and cyclical crises is just about the opposite of what conduces to the stability of mass-production industry.

Conversely, though, the system prevailing in industrial districts like Emilia-Romagna is called "flexible manufacturing" for a reason. It is able to reallocate dedicated capital goods and shift contractual relationships, and do so quite rapidly, in response to sudden changes in the environment.

Although craft production has always tended to expand relative to mass-production industry during economic downturns, it was only in the prolonged stagnation of the 1970s and '80s that it began permanently to break out of its peripheral status.

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44 James Howard Kunstler, "Lagging Recognition," *Clusterfuck Nation*, June 8, 2009 <http://kunstler.com/blog/2009/06/lagging-recognition.html>
45 James Howard Kunstler, *The Long Emergency: Surviving the Converging Catastrophes of the Twenty-First Century* (New York: Atlantic Monthly Press, 2005), pp. 264-265.
46 Piore and Sabel, *Second Industrial Divide*, p. 48.
47 Ibid., p. 192.

> From the second industrial revolution at the end of the nineteenth century to the present, economic downturns have periodically enlarged the craft periphery with respect to the mass-production core—but without altering their relationship. Slowdowns in growth cast doubt on subsequent expansion; in an uncertain environment, firms either defer mass-production investments or else switch to craft-production techniques, which allow rapid entry into whatever markets open up. The most straightforward example is the drift toward an industrial-subsistence, or -repair, economy: as markets stagnate, the interval between replacements of sold goods lengthens. This lengthened interval increases the demand for spare parts and maintenance services, which are supplied only by flexibly organized firms, using general-purpose equipment. The 1930s craftsman with a tool kit going door to door in search of odd jobs symbolizes the decreased division of labor that accompanies economic retrocession: the return to craft methods.
>
> But what is distinctive about the current crisis is that the shift toward greater flexibility is provoking technological sophistication—rather than regression to simple techniques. As firms have faced the need to redesign products and methods to address rising costs and growing competition, they have found new ways to cut the costs of customized production.... In short, craft has challenged mass production as the paradigm.[48]

In the case of small Japanese metalworking firms, American minimills and the Pratese textile industry, the same pattern prevailed. Small subcontractors of larger manufacturing firms "felt the increasing volatility of their clients' markets; in response, they adopted techniques that reduced the time and money involved in shifting from product to product, and that also increased the sophistication and quality of the output."[49]

In the Third Italy in particular, large mass-production firms outsourced an increasing share of components to networks of small, flexible manufacturers. The small firms, initially, were heavily dependent on the large ones as outlets. But new techniques and machine designs made production increasingly efficient in the small firms.

> In some cases... the larger equipment is miniaturized. In other cases, however, artisan-like techniques of smelting, enameling, weaving, cutting, or casting metal are designed into new machines, some of which are controlled by sophisticated microprocessors.

At the same time, small firms which previously limited themselves to supplying components to a large manufacturer's blueprints instead began marketing products of their own.[50]

So a shift has taken place, with the work formerly done by vertically integrated firms being outsourced to flexible manufacturing networks, and with a smaller and smaller share of essential functions that can only be performed by the core mass-production firm.

The physical form of production, in both the Toyota Production System and in the Emilia-Romagna model of local manufacturing networks, is beginning—after a long mass-production interlude—to resemble the original neotechnic promise of integrating power machinery into craft production.

But the neotechnic, even though it has finally begun to emerge as the basis of a new, coherent production model governed by its own laws, is still distorted by the pseudomorph in a weaker form: the new form of production still takes place within a persistent corporate framework of marketing, finance and "intellectual property."

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48 Ibid., p. 207.
49 Ibid., p. 218.
50 Piore and Sabel, "Italian Small Business Development," pp. 397-398.

Andy Robinson, a member of the P2P Research email list, brilliantly drew the parallels between the decay of the pseudomorph in the industrial and political realms:

> I think part of the crisis of the 70s has to do with networks and hierarchies. The "old" system was highly hierarchical, but was suffering problems from certain kinds of structural weaknesses in relation to networks —the American defeat in Vietnam being especially important.... And ever since the 70s the system has been trying to find hybrids of network and hierarchy which will harness and capture the power of networks without leading to "chaos" or system-breakdown. We see this across a range of fields: just-in-time production, outsourcing and downsizing, use of local subsidiaries, contracting-out, Revolution in Military Affairs, full spectrum dominance, indirect rule through multinational agencies, the Nixon Doctrine, joined-up governance, the growing importance of groups such as the G8 and G20, business networks, lifelong learning, global cities, and of course the development of new technologies such as the Internet....
>
> In the medium term, the loss of power to networks is probably irreversible, and capital and the state will either go down fighting or create more-or-less stable intermediary forms which allow them to persist for a time. We are already seeing the beginnings of the latter, but the former is more predominant. The way I see the crisis deepening is that large areas will drift outside state and capitalist control, integrated marginally or not at all (this is already happening at sites such as Afghanistan, NWFP, the Andes, Somalia, etc., and in a local way in shanty-towns and autonomous centres). I also expect the deterritorialised areas to spread, as a result of the concentration of resources in global cities, the ecological effects of extraction, the neoliberal closing of mediations which formerly integrated, and the growing stratum of people excluded either because of the small number of jobs available or the growing set of requirements for conformity. Eventually these marginal spaces will become sites of a proliferation of new forms of living, and a pole of attraction compared to the homogeneous, commandist, coercive core.[51]

So long as the state successfully manages to prop up the corporate economic order, libertarian and decentralist technologies and organizational forms will be incorporated into the old centralized, hierarchical framework. As the system approaches its limits of sustainability, those elements become increasingly destabilizing forces within the present system, and prefigure the successor system. When the system finally reaches those limits, those elements will (to paraphrase Marx) break out of their state capitalist integument and become the building blocks of a fundamentally different society. We are, in short, building the foundations of the new society within the shell of the old.

The second stage of the pseudomorph is weakening, however. For example, although the Nike model of “outsourcing everything” and retaining corporate control of an archipelago of small manufacturing shops still prevails to a considerable extent among U.S.-based firms, small subcontractors elsewhere have increasingly rebelled against the hegemony of the large corporate clients. In Italy and Japan the subcontractors have federated among themselves to create flexible manufacturing networks and reduce their dependence on any one outlet for their products.[52] The result is that the corporate headquarters, increasingly, is becoming a redundant node in a network—a redundant node that can be bypassed.

Indeed, the Nike model is itself extremely vulnerable to such bypassing. As David Pollard observes:

> In their famous treatise explaining the Internet phenomenon, Doc Searls, Dave Weinberger et al said that what made the Internet so powerful and so resilient was that it had no control 'centre' and no hierarchy: All

51 Andy Robinson, “[p2p research] Berardi essay,” P2P Research email list, May 25, 2009 <http://listcultures.org/pipermail/p2presearch_listcultures.org/2009-May/003079.html>.
52 Piore and Sabel, *Second Industrial Divide*, pp. 226-227.

> the value was added, by millions of people, at the 'ends'. And if someone tried to disrupt it, these millions of users would simply work around the disruption. There is growing evidence that the same phenomenon is happening in businesses, which have long suffered from diseconomies of scale and bureaucracy that stifle innovation and responsiveness. Think of this as a kind of 'outsourcing of everything' (parodied in the cartoon above). Already companies like Levi Strauss make nothing at all—they simply add their label to stuff made by other companies, and distribute it (largely through independent companies they don't own either).[53]

If the people actually producing and distributing the stuff ever decide they have the right to market an identical product, Levi Strauss's ownership of the label notwithstanding, Levi's is screwed.

As a general phenomenon, the shift from physical to human capital as the primary source of productive capacity in so many industries, along with the imploding price and widespread dispersion of ownership of capital equipment in so many industries, means that corporate employers are increasingly hollowed out and only maintain control over the physical production process through legal fictions. When so much of actual physical production is outsourced to the small sweatshop or the home shop, the corporation becomes a redundant "node" that can be bypassed; the worker can simply switch to independent production, cut out the middleman, and deal directly with suppliers and outlets.

A good example of the weakness of the second stage of the pseudomorph is the relationship of the big automakers with parts suppliers today, compared to when Galbraith wrote forty years ago. As portrayed in The New Industrial State, the relationship between large manufacturers and their suppliers was one of unilateral market control. Today, General Motors and Toyota are likely to share most of their suppliers in common. Taking into account only the technical capabilities of the suppliers, it's quite feasible for parts suppliers to produce generic replacement parts in competition with the auto giants, to produce competing modular components designed for a GM or Toyota platform, or even to network to produce entirely new car designs piggybacked on a GM or Toyota chassis and engine block. The only thing stopping them is trademark and patent law.

(Failed) Attempts to Counteract the Crisis of Value with Enclosure of the Digital Commons

As Michel Bauwens describes it, it is becoming increasingly impossible to capture value from the ownership of ideas, designs, and technique—all the "ephemera" and "intellect" that Tom Peters writes about as a component of commodity price—leading to a crisis of sustainability for capitalism. “Cognitive capitalism” is capital's attempt to adjust to the shift from physical to human capital, and to capture value from the immaterial realm. Bauwens cites McKenzie Wark's theory that a new “vectoralist” class “has arisen which controls the vectors of information, i.e. the means through which information and creative products have to pass, for them to realize their exchange value.” This describes “the processes of the last 40 years, say the post-1968 period, which saw a furious competition through knowledge-based competition and for the acquisition of knowledge assets, which led to the extraordinary weakening of the scientific and technical commons. And they do this rather well.”[54]

Cognitive capitalism arose as a solution to the unsustainability of the older pattern of capitalist growth, based on extensive addition of physical inputs and expansion into new geographical areas. Bauwens uses the analogy of the ancient slave economy, which depended on physical expansion and

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53 David Pollard, “Ten Important Business Trends,” *How to Save the World*, May 12, 2009 <http://blogs.salon.com/0002007/2009/05/12.html#a2377>.
54 Michel Bauwens, *P2P and Human Evolution.* Draft 1.994 (Foundation for P2P Alternatives, June 15, 2005) <http://integralvisioning.org/article.php?story=p2ptheory1>.

the acquisition of new, external sources of slaves, to compensate for the internal stagnation and lack of productivity of the system. When the slave system reached its limits of external expansion, it turned to intensive development via the feudal manor system, transforming the slave into a peasant who had an incentive to work the land more efficiently.

> The alternative to extensive development is intensive development, as happened in the transition from slavery to feudalism. But notice that to do this, the system had to change, the core logic was no longer the same. The dream of our current economy is therefore one of intensive development, to grow in the immaterial field, and this is basically what the experience economy means. The hope that it expresses is that business can simply continue to grow in the immaterial field of experience.[55]

And the state, as enforcer of the total surveillance society and copyright lockdown, is central to this business model. Soderberg relates the crisis of realization under state capitalism to capital's growing dependence on the state to capture value from social production and redistribute it to private corporate owners. This takes the form both of "intellectual property" law, as well as direct subsidies from the taxpayer to the corporate economy. He compares, specifically, the way photocopiers were monitored in the old USSR to protect the power of elites in that country, to the way the means of digital reproduction are monitored in this country to protect corporate power.[56] James O'Connor's theme, of the ever-expanding portion of the operating expenses of capital which come from the state, is also relevant here, considering the extent to which the technical prerequisites of the digital revolution were developed with state financing.[57]

Economist Paul Romer, he of the so-called “New Growth Theory,” is a sort of prophet of cognitive capitalism. For Romer, whom *Reason*'s Ron Bailey fawningly (and predictably) called a “post-scarcity prophet,” post-scarcity technology is all about growth in GDP and per capita income.[58] Of course that's nonsense. The normal tendency for post-scarcity innovation is to *destroy* GDP. The reason is that GDP reflects the cost of production inputs. So any innovation that reduces the capital outlays and overhead, labor time, and resources consumed to produce a unit of consumption will cause a portion of GDP to implode. The Romer (and Bill Gates, and Richard Florida, and William McDonough) model of “cognitive capitalism” depends on allowing a rentier class of “intellectual property” owners to capitalize production cost savings, instead of allowing market competition to pass them on to the consumer.

The cognitive capitalist approach is, in fact, failing in the face of the increasing inability to capture value from the immaterial realm. The strategy of shifting the burden of realization onto the state is untenable. Strong encryption, coupled with the proliferation of bittorrent and episodes like the DeCSS uprising, have shown that "intellectual property" is ultimately unenforceable. J. A. Pouwelse and his coauthors estimate that the continuing exponential advance of file-sharing technology will make

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55 Michel Bauwens, "Can the experience economy be capitalist?" *P2P Foundation Blog*, September 27, 2007 <http://blog.p2pfoundation.net/can-the-experience-economy-be-capitalist/2007/09/27>. Joseph Tainter's thesis, that the collapse of complex societies results from the declining marginal productivity of increases in complexity or expansion, is relevant here; *The Collapse of Complex Societies* (Cambridge, New York, New Rochelle, Melbourne, Sydney: Cambridge University Press, 1988). In particular, he echoes Bauwens' thesis that classical civilization failed as a result of the inability to continue extensive addition of inputs through territorial expansion. As we will see shortly below, it is the inability to capture sufficient marginal returns on new increments of capital investment and innovation, in an era of “Free,” that is destroying the existing economic system.

56 Johan Soderberg, *Hacking Capitalism: The Free and Open Source Software Movement* (New York and London: Routledge, 2008), pp. 144-145.

57 O’Connor, *Fiscal Crisis of the State*.

58 Ronald Bailey, “Post-Scarcity Prophet: Economist Paul Romer on growth, technological change, and an unlimited human future,” *Reason*, December 2001 <http://www.reason.com/news/show/28243.html>.

copyright “impossible to enforce by 2010.”[59] In particular, they mention

> anonymous downloading, uploading, and injection of content using a darknet. A darknet inhibits both Internet censorship and enforcement of copyright law. The freenetproject.org has in 2000 already produced a darknet, but it was slow, difficult to use, and offered little content. Darknets struggle with the second cardinal feature of P2P platforms. Full anonymity costs both extra bandwidth and is difficult to combine with enforcement of resource contributions. By 2010 darknets should be able to offer the same performance as traditional P2P software by exploiting social networking. No effective legal or technological method currently exits to stop darknets, with the exception of banning general-purpose computing. Technologies such as secure computing and DRM are convincingly argued to be unable to stop darknets.[60]

The proliferation of peer production and the open-source model, and the growing unenforceability of the “intellectual property” rules on which the capture of value depends, is creating “a vast new information commons..., which is increasingly out of the control of cognitive capitalism.”[61] Capital, as a result, is incapable of realizing returns on ownership in the cognitive realm. As Bauwens explains it:

> 1) The creation of non-monetary value is exponential
>
> 2) The monetization of such value is linear
>
> In other words, we have a growing discrepancy between the direct creation of use value through social relationships and collective intelligence..., but only a fraction of that value can actually be captured by business and money. Innovation is becoming... an emergent property of the networks rather than an internal R & D affair within corporations; capital is becoming an a posteriori intervention in the realization of innovation, rather than a condition for its occurrence....
>
> What this announces is a crisis of value..., but also essentially a crisis of accumulation of capital. Furthermore, we lack a mechanism for the existing institutional world to re-fund what it receives from the social world. So on top of all of that, we have a crisis of social reproduction....

Thus, while markets and private ownership of physical capital will persist, "the core logic of the emerging experience economy, operating as it does in the world of non-rival exchange, is unlikely to have capitalism as its core logic."[62]

This is reflected especially in the tendency, during periods of economic stagnation, for reduced hours of wage labor to be offset by increased self-employment or production of use-value in the informal economy.

This happened in the stagnation of the 1970s and 1980s, as described by James O'Connor: "the accumulation of stocks of means and objects of reproduction within the household and community took the edge off the need for alienated labor."

> Labor-power was hoarded through absenteeism, sick leaves, early retirement, the struggle to reduce days worked per year, among other ways. Conserved labor-power was then expended in subsistence production.... The living economy based on non- and anti-capitalist concepts of time and space went

59 J.A. Pouwelse, P. Garbacki, D.H.J. Epema, and H.J. Sips, “Pirates and Samaritans: a Decade of Measurements on Peer Production and their Implications for Net Neutrality and Copyright” (The Netherlands: Delft University of Technology, 2008) <http://www.tribler.org/trac/wiki/PiratesSamaritans>., p. 20.
60 Ibid., p. 15.
61 Bauwens, *P2P and Human Evolution*.
62 Bauwens, “Can the experience economy be capitalist?”

underground: in the reconstituted household; the commune; cooperatives; the single-issue organization; the self-help clinic; the solidarity group. Hurrying along the development of the alternative and underground economies was the growth of underemployment... and mass unemployment associated with the crisis of the 1980s. "Regular" employment and union-scale work contracted, which became an incentive to develop alternative, localized modes of production....

...New social relationships of production and alternative employment, including the informal and underground economies, threatened not only labor discipline, but also capitalist markets.... Alternative technologies threatened capital's monopoly on technological development... Hoarding of labor-power threatened capital's domination of production. Withdrawal of labor-power undermined basic social disciplinary mechanisms....[63]

It was reflected in the shift of innovation to the social sphere, in the rise of Web 2.0 following the collapse of the Dot.Com Bubble. Michel Bauwens described the way most innovation has shifted to the social realm and become independent of capital.

To understand the logic of this promise, we can look to a less severe, but nevertheless serious crisis: that of the internet bubble collapse in 2000-1. As an internet entrepreneur, I personally experienced both the manic phase, and the downturn, and the experience was life changing because of the important discovery I and others made at that time. All the pundits where predicting, then as now, that without capital, innovation would stop, and that the era of high internet growth was over for a foreseeable time. In actual fact, the reality was the very opposite, and something apparently very strange happened. In fact, almost everything we know, the Web 2.0, the emergence of social and participatory media, was born in the crucible of that downturn. In other words, innovation did not slow down, but actually increased during the downturn in investment. This showed the following new tendency at work: capitalism is increasingly being divorced from entrepreneurship, and entrepreneurship becomes a networked activity taking place through open platforms of collaboration.

The reason is that internet technology fundamentally changes the relationship between innovation and capital. Before the internet, in the Schumpeterian world, innovators need capital for their research, that research is then protected through copyright and patents, and further funds create the necessary factories. In the post-schumpeterian world, creative souls congregate through the internet, create new software, or any kind of knowledge, create collaboration platforms on the cheap, and paradoxically, only need capital when they are successful, and the servers risk crashing from overload. As an example, think about Bittorrent, the most important software for exchanging multimedia content over the internet, which was created by a single programmer, surviving through a creative use of some credit cards, with zero funding. But the internet is not just for creative individual souls, but enables large communities to cooperate over platforms. Very importantly, it is not limited to knowledge and software, but to everything that knowledge and software enables, which includes manufacturing. Anything that needs to be physically produced, needs to be ‘virtually designed’ in the first place.

This phenomena [sic] is called social innovation or social production, and is increasingly responsible for most innovation....

But what does this all mean for the Asian economic crisis and the plight of the young people that we touched upon at the beginning? The good news is this: first, the strong distinction between working productively for a wage, and idly waiting for one, is melting. All the technical and intellectual tools are available to allow young people, and older people for that matter, to continue being engage [sic] in value production, and hence also to continue to build their experience (knowledge capital), their social life (relationship capital) and reputation. All three of which will be crucial in keeping them not just employable, but will actually substantially increase their potential and capabilities. The role of business must be clear: it

63 James O'Connor, *Accumulation Crisis* (New York: Basil Blackwell, 1984), pp. 184-186.

> can, on top of the knowledge, software or design commons created by social production, create added value services that are needed and demanded by the market of users of such products (which includes other businesses), and can in turn sustain the commons from which it benefits, making the ecology sustainable. While the full community of developers create value for businesses to build upon, the businesses in term help sustain the infrastructure of cooperation which makes continued development possible.[64]

A good example is the way in which digital culture, according to Douglas Rushkoff, destroyed California's economy:

> The fact is, most Internet businesses don't require venture capital. The beauty of these technologies is that they decentralize value creation. Anyone with a PC and bandwidth can program the next Twitter or Facebook plug-in, the next iPhone app, or even the next social network. While a few thousand dollars might be nice, the hundreds of millions that venture capitalists want to—need to—invest, simply aren't required....
>
> The banking crisis began with the dot.com industry, because here was a business sector that did not require massive investments of capital in order to grow. (I spent an entire night on the phone with one young entrepreneur who secured $20 million of capital from a venture firm, trying to figure out how to possibly spend it. We could only come up with $2 million of possible expenditures.) What's a bank to do when its money is no longer needed?...
>
> So they fail, the tax base decreases, companies based more on their debt structures than their production fail along with them, and we get an economic crisis. Yes, the Internet did all this.
>
> But that's also why the current crisis should be seen as a cause for celebration as well: the Internet actually did what it was supposed to by decentralizing our ability to create and exchange value.
>
> This was the real dream, after all. Not simply to pass messages back and forth, but to dis-intermediate our exchanges. To cut out the middleman, and let people engage and transact directly.
>
> This is, quite simply, cheaper to do. There's less money in it. Not necessarily less money for us, the people doing the exchanging, but less money for the institutions that have traditionally extracted value from our activity. If I can create an application or even a Web site like this one without borrowing a ton of cash from the bank, then I am also undermining America's biggest industry—finance.
>
> While we rightly mourn the collapse of a state's economy, as well as the many that are to follow, we must—at the very least—acknowledge the real culprit. For digital technology not only killed the speculative economy, but stands ready to build us a real one.[65]

The actual physical capital outlays required for digital creation are simply unable to absorb anything like the amounts of surplus capital in search of a profitable investment outlet—unless artificial property rights and artificial scarcity can be used to exclude independent production by all but the corporate owners of “intellectual property,” and mandate outlays totally unrelated to the actual physical capital requirements for production. Since such artificial property rights are, in fact, becoming increasingly unenforceable, investment capital is unable either to combat its own growing superfluity in the face of low-overhead production, or to capture value through artificial scarcity by suppressing low-overhead competition.

More recently, the shift of value-creation outside the cash nexus provoked an interesting

64 Michel Bauwens, “Asia needs a Social Innovation Stimulus plan,” *P2P Foundation Blog*, March 23, 2009 <http://blog.p2pfoundation.net/asia-needs-a-social-innovation-stimulus-plan/2009/03/23>.
65 Douglas Rushkoff, “How the Tech Boom Terminated California's Economy,” *Fast Company*, July 10, 2009 <http://www.fastcompany.com/article/how-tech-boom-terminated-californias-economy?page=0%2C1>.

blogospheric discussion between Tyler Cowen and John Quiggin. Cowen raised the possibility that much of the productivity growth in recent years has taken place "outside of the usual cash and revenue-generating nexus."[66] Quiggin, in an article appropriately titled "The end of the cash nexus," took the idea and ran with it:

> There has been a huge shift in the location of innovation, with much of it either deriving from, or dependent on, public goods produced outside the market and government sectors, which may be referred to as social production....
>
> If improvements in welfare are increasingly independent of the market, it would make sense to shift resources out of market production, for example by reducing working hours. The financial crisis seems certain to produce at least a temporary drop in average hours, but the experience of the Depression and the Japanese slowdown of the 1990s suggest that the effect may be permanent....[67]

If, as we saw in earlier chapters, economic downturns tend to accelerate the expansion of the custom industrial periphery at the expense of the mass-production core, downturns also accelerate the shift from wage labor to self-employment or informal production outside the cash nexus. The main cause for the apparently stable level of unemployment, despite a decrease in the number of employed, is that so many "discouraged workers" have disappeared from the unemployment rolls altogether. At the same time, numbers for self-employment are continuing to rise.

> We [Canadians] lost another 45,000 jobs in July, but the picture is much worse on closer examination. There were 79,000 fewer workers in paid jobs compared to June, while self-employment rose by 35,000. This was on top of another big jump in self-employment of 37,000 last month.
>
> Put it all together and the picture is of large losses in paid jobs, with the impact on the headline unemployment rate cushioned by workers giving up the search for jobs or turning to self-employment.[68]

Rushkoff's reference above to the collapsing tax base is especially interesting. As we have already seen, in an economy of subsidized inputs, the demand for such inputs grows exponentially, faster than the state can meet them. The state capitalist system will soon reach a point at which, thanks to the collapse of the portion of value comprised of rents on artificial property, the base of taxable value is imploding at the very time big business most needs subsidies to stay afloat. In the words of Charles Hughes Smith,

> what if the "end of paying work" will bring down the entire credit/consumption-dependent economy and the Federal government which depends on tax revenues from all that financial churn?...
>
> What if the Web, which is busily (creatively) destroying print media, the music industry, the movie business, Microsoft and many other rentier-type enterprises, ends up destroying income and profit-based tax revenues? How can the government support a status quo which requires $2 trillion in new borrowing every year just to keep from collapsing? What if that debt load is unsustainable?[69]

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66 Tyler Cowen, "Was recent productivity growth an illusion?" *Marginal Revolution*, March 3, 2009 <http://www.marginalrevolution.com/marginalrevolution/2009/03/was-recent-productivity-growth-an-illusion.html>.
67 John Quiggin, "The End of the Cash Nexus," *Crooked Timber*, March 5, 2009 <http://crookedtimber.org/2009/03/05/the-end-of-the-cash-nexus>.
68 Andrew Jackson, "Recession Far From Over," *The Progressive Economics Forum*, August 7, 2009 <http://www.progressive-economics.ca/2009/08/07/recession-far-from-over/>.
69 Charles Hugh Smith, "What if the (Debt Based) Economy Never Comes Back?" *Of Two Minds*, July 2, 2009 <http://www.oftwominds.com/blogjuly09/what-if07-09.html>.

So the fiscal crisis of the state is accelerated not only by Peak Oil, but by the collapse of proprietary information as a source of value.

This crisis of realization for investment capital and collapse of the tax base, in the face of an explosion of low-overhead desktop manufacturing, is the backdrop for Cory Doctorow's forthcoming *Makers*.[70]

The growing importance of human capital relative to physical capital, another effect of the implosion of material outlays and overhead for production, is also creating governability problems for the standard absentee-owned, hierarchical corporate enterprise. At the same time, there is a growing inability to enforce corporate boundaries on human capital because of the unenforceability of "intellectual property." Fifty years ago, enormous outlays on physical capital were the main structural basis for the corporation as a locus of control over physical assets. Today, for a growing number of industries, the physical capital requirements for entering the market have imploded. Goodwill and human capital are the primary sources of corporate equity, as we saw in the second C4SS paper, and "intellectual property" is the main structural support to corporate boundaries.

In this environment, the only thing standing between the old information and media dinosaurs and their total collapse is their so-called "intellectual property" rights—at least to the extent they're still enforceable. Ownership of "intellectual property" becomes the new basis for the power of institutional hierarchies, and the primary structural bulwark for corporate boundaries. Without them, in any industry where the basic production equipment is affordable to all, and bottom-up networking renders management obsolete, it is likely that self-managed, cooperative production will replace the old managerial hierarchies. The network revolution, if its full potential is realized,

> will lead to substantial redistribution of power and money from the twentieth century industrial producers of information, culture, and communications—like Hollywood, the recording industry, and perhaps the broadcasters and some of the telecommunications giants—to a combination of widely diffuse populations around the globe, and the market actors that will build the tools that make this population better able to produce its own information environment rather than buying it ready-made."[71]

II. Relocalized Manufacturing

With the decay of Mumford's "cultural pseudomorph," we see the resurrection of alternatives to mass production as a response to the systemic crises discussed above. Today, in both Toyota's "single minute exchange of dies" and in the flexible production in the shops of thee Third Italy, factory production takes on many of the characteristics of custom production. With standardized, modular components and the ability to switch quickly between various combinations of features, production approaches a state of affairs in which every individual item coming out of the factory is unique. A small factory or workshop, frequently switching between products, can still obtain most of mass production's economies of uniformity through the simple expedient of modular design. Lean

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70 The first part of an earlier manuscript of the book was serialized as Themepunks at Salon <http://dir.salon.com/story/tech/feature/2005/09/12/themepunks_1/index.html>; the final print version will be released by Tor Books in October, and is currently being serialized online by Tor <http://www.tor.com/index.php?option=com_content&view=blog&id=35734>.

71 James C. Bennett, "The End of Capitalism and the Triumph of the Market Economy," from *Network Commonwealth: The Future of Nations in the Internet Era* (1998, 1999) <http://www.pattern.com/bennettj-endcap.html>.

production is a synthesis of the good points of mass production and custom or craft production.

Lean production, broadly speaking, has taken two forms: the Toyota Production System and Emilia-Romagna.

Robert Begg et al characterize them, respectively, as two ways of globally organizing flexible specialization: producer-driven commodity chains and consumer-driven commodity chains. The former model, exemplified to some extent by most global manufacturing corporations as well as by the TPS itself, outsources production to small, networked supplier firms. Such firms usually bear the brunt of economic downturns, and have (because they must compete for corporate patronage) have little bargaining power against the corporate purchasers of their output. The latter entails cooperative networks of small firms for which a large corporate patron most likely doesn't even exist, and production is driven by demand.[72] (Of course the large manufacturing corporations, in the former model, are far more vulnerable to bypassing by networked suppliers than the authors' description would suggest.)

The interesting thing about the Toyota Production System is that it's closer to craft production than to Ford's model of mass production. In many ways, it's Craft Production 2.0.

Craft production, as described by James Womack et al in *The Machine That Changed the World*, was characterized by

- A workforce that was highly skilled in design, machine operation, and fitting....
- Organizations that were extremely decentralized, although concentrated within a single city. Most parts and much of the vehicle's design came from small machine shops. The system was coordinated by an owner/entrepreneur in direct contact with everyone involved—customers, employers, and suppliers.
- The use of general-purpose machine tools to perform drilling, grinding, and other operations on metal and wood.
- A very low production volume....[73]

The last characteristic, low volume (Panhard et Levassor's custom automobile operation produced a thousand or fewer vehicles a year), resulted from the inability to standardize parts, which in turn resulted from the inability of machine tools to cut hardened steel. Before this capability was achieved, it would have been a waste of time to try producing to gauge; steel parts had to be cut and then hardened, which distorted them so that they had to be custom-fitted. The overwhelming majority of production time was taken up by filing and fitting each individual part to the other parts on (say) a car.

Most of the economies of speed achieved by Ford resulted, not from the assembly line (although as a secondary matter it may be useful for maintaining production flow), but from precision and interchangeability. Ford was the first to take advantage of advances in machine tools which enabled them to work on prehardened metal. As a result, he was able to produce parts to a standardized

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72 Robert Begg, Poli Roukova, John Pickles, and Adrian Smith, "Industrial Districts and Commodity Chains: The Garage Firms of Emilia-Romagna (Italy) and Haskovo (Bulgaria)," *Problems of Geography* (Sofia, Bulgarian Academy of Sciences), 1-2 (2005), p. 162. The original distinction was borrowed from G. Gereffi, "International Trade and Industrial Upgrading in the Apparel Commodity Chain," *Journal of International Economics* 48:1 (1999), pp. 37-70.
73 James P. Womack, Daniel T. Jones, and Daniel Roos, *The Machine That Changed the World* (New York, Toronto, London, Sydney: The Free Press, 1990 and 2007), p. 22.

gauging system that remained constant throughout the manufacturing process.[74] In so doing, he eliminated the old job of fitter, which was the primary source of cost and delay in custom production.

But this most important innovation of Ford's—interchangeable parts produced to gauge—could have been introduced just as well into craft production, radically increasing the output and reducing the cost of craft industry. Ford managed to reduce task cycle time for assemblers from 514 minutes to 2.3 minutes by August 1913, before he ever introduced the moving assembly line. The assembly line itself reduced cycle time only from 2.3 to 1.19 minutes.[75]

With this innovation, a craft producer might still have used general-purpose machinery and switched frequently between products, while using precision machining techniques to produce identical parts for a set of standardized modular designs. By removing the main cost of fitting from craft production ("all filing and adjusting of parts had... been eliminated), and reducing setup time (see below), craft producers would have achieved many of the efficiencies of mass production with none of the centralization costs we saw in the previous paper.

In a brilliant illustration of history's tendency to recur as farce, by the way, GM's batch-and-queue production resurrected the old job of fitter, supposedly eliminated forever by production to gauge, to deal with the enormous output of defective parts. At GM's Framingham plant, besides the weeks' worth of inventory piled among the work stations, Waddell and his co-authors found workers "struggling to attach poorly fitting parts to the Oldsmobile Ciera models they were building."[76]

The other cost of craft production was setup time: the cost and time entailed in skilled machinists readjusting machine tools for different products. Ford reduced setup time through the use of product-specific machinery, foolproofed with simple jigs and gauges to ensure they worked to standard.[77] The problem was that this required batch production, the source of all the inefficiencies we saw in Chapter Two.

This second cost was overcome in the Toyota Production System by Taichi Ohno's "single-minute exchange of dies" (SMED), which reduced the changeover time between products by several orders of magnitude. By the time of World War II, in American-style mass production, manufacturers were dedicating a set of presses to specific parts for months or even years at a time in order to minimize the unit costs from a day or more of downtime to change dies.[78] Ohno, beginning in the late 1940s to experiment with used American machinery, by the late 1950s managed to reduce die-change time to three minutes. In so doing, he discovered that (thanks to the elimination of in-process inventories, and thanks to the fact that defects showed up immediately at the source) "it actually cost less per part to make small batches of stampings than to run off enormous lots."[79] In effect, he turned mass-production machinery into general-purpose machinery.

In industrial districts like Emilia-Romagna, the problem of setup and changeover time was overcome by the development of flexible general purpose machine tools, particularly the small numerically controlled machine tools which the microprocessor revolution permitted in the 1970s. Ford's innovations in precision cutting of pre-hardened metal to gauge, and the elimination of setup

74 Ibid., pp. 24-25.
75 Ibid., pp. 25-26.
76 Ibid., p. 78.
77 Ibid., p. 33.
78 Ibid., p. 51.
79 Ibid., p. 52.

time with small CNC tools in the 1970s, between them made it possible for craft production to capture all the efficiencies of mass production.

The numerically controlled machine tools of American mass-production industry, scaled down thanks to the microprocessor revolution, became suitable as a form of general-purpose machinery for the small shop. As developed by the Japanese, it was

> a new kind of machine tool: numerically controlled general-purpose equipment that is easily programmed and suited for the thousands of small and medium-sized job shops that do much of the batch production in metalworking. Until the mid-1970s, U.S. practice suggested that computer-controlled machine tools could be economically deployed only in large firms (typically in the aerospace industry); in these firms such tools were programmed, by mathematically sophisticated technicians, to manufacture complex components. But advances in the 1970s in semiconductor and computer technology made it possible to build a new generation of machine tools: numerically controlled (NC) or computer-numerical-control (CNC) equipment. NC equipment could easily be programmed to perform the wide range of simple tasks that make up the majority of machining jobs. The equipment's built-in microcomputers allowed a skilled metalworker to teach the machine a sequence of cuts simply by performing them once, or by translating his or her knowledge into a program through straightforward commands entered via a keyboard located on the shop floor.[80]

Ohno's system was essentially a return to craft production methods, but with the speed of Ford's mass production assembly line. With the single-minute exchange of dies, factory machinery bore more of a functional resemblance to general-purpose machinery than to the dedicated and inflexible machinery of GM. But with precision cutting capabilities and a few standardized, modular designs, it achieved nearly the same economies of speed as mass production.

We already described, in the previous paper, how Sloanism's "economies of speed" differ from those of the Toyota Production System. The irony, according to William Waddell and Norman Bodek, is that Toyota and other lean manufacturers reduce direct labor costs (supposedly the raison d'etre of Sloanism) "at rates that leave Sloan companies in the dust."

> The critical technology to cutting direct labor hours by fifty percent or more is better than sixty years old. Electric motors small enough and powerful enough to drive a machine tool had a negligible impact on productivity in America, but a huge impact in Japan.
>
> When belt drives came off of machines, and each machine was powered by its own electric motor the door opened up to a productivity improvement equal to that realized by Henry Ford with the advent of the assembly line....
>
> ...[T]he day came in the evolution of electrical technology that each machine could be equipped with its own motor. Motors were powerful enough, small enough and cheap enough for the belts and shafts to go by the wayside....
>
> To American thinking, this was not much of an event. Sloan's system was firmly entrenched by the time the shafts and belts were eliminated. Economy was perceived to result exclusively from running machines as fast as possible, making big batches at a time. There was still one man to one machine, for the most part, and maximizing the output from that man's labor cost was the objective. Whether machines were lined up in rows, or scattered at random around the factory did not make much difference to the results of that equation.
>
> Shigeo Shingo presented a paper at a technical conference conducted by the Japan Management Association in 1946 entitled "Production Mechanism of Process and Operation." It was based on the

80 Piore and Sabel, *Second Industrial Divide*, p. 218.

> principle that optimizing the overall production process... is the key to manufacturing. To quote Shingo, "Improvement of process must be accomplished prior to improvement of operation." While the Americans saw manufacturing as a set of isolated operations, all linked by sizeable inventories, the Japanese saw manufacturing as a flow. Where the machines are is a big deal to people concerned about flow while it matters little to people concerned only with isolated operations. To Shingo, the flexibility to put machines anywhere he wanted opened the door to fantastic productivity improvments.[81]

In other words, lean manufacturing—to quote Sabel and Piore once again—amounts to the discovery, after a century-long dead end, of how to integrate electrical power into manufacturing.

Emilia-Romagna is part of a larger phenomenon, the so-called "Third Italy" (as opposed to the old industrial triangles of Milan-Turin-Genoa, and the cash crop plantation agriculture of Naples and Sicily):

> a vast network of very small enterprises spread through the villages and small cities of central and Northeast Italy, in and around Bologna, Florence, Ancona, and Venice.... These little shops range across the entire sprectrum of the modern industrial structure, from shoes, ceramics, textiles, and garments on one side to motorcycles, agricultural equipment, automotive parts, and machine tools on the other.[82]

Although these small shops (quite small on average, with ten workers or fewer not unusual) "perform an enormous variety of the operations associated with mass production," they do so using "artisans' methods rather than industrial techniques of production."[83]

A typical factory is housed on the ground floor of a building, with two or three floors of apartments above for the several extended families that own it.

> The workrooms are clean and spacious. A number of hand operations are interspersed with the mechanized ones. The machinery, however, is fully modern technology and design; sometimes it is exactly the same as that found in a modern factory, sometimes a reduced version of a smaller machine. The work is laid out rationally: the workpieces flow along miniature conveyors, whose twists and turns create the impression of a factory in a doll house.[84]

At the smaller end of the scale, "production is still centered in the garage..."

Despite high productivity, the pace of work is typically relaxed, with production stopping daily for workers to retreat to their upstairs apartments for an extended lunch or siesta.[85]

Production on the Emilia-Romagna model is regulated on a demand-pull basis: general-purpose machinery makes it possible to produce in small batches and switch frequently and quickly from one product line to another, as orders come in. Further, with the separate stages of production broken down in a networked relationship between producers, constant shifts in contractual relationships between suppliers and outlets are feasible at relatively low cost.[86]

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81 Waddell and Bodek, pp. 119-122.
82 Piore and Sabel, "Italian Small Business Development: Lessons for U.S. Industrial Policy," in John Zysman and Laura Tyson, eds., *American Industry in International Competition: Governnment Policies and Corporate Strategies* (Ithaca and London: Cornell University Press, 1983).
83 Ibid, pp. 392-393.
84 Ibid., p. 394.
85 Ibid., p. 394.
86 Piore and Sabel, *Second Industrial Divide*, pp. 29-30.

While the small subcontractors in a sector are zealous of their autonomy and often vigorously competitive, they are also quite likely to collaborate as they become increasingly specialized, "subcontracting to each other or sharing the cost of an innovation in machine design that would be too expensive for one producer to order by himself." There is a tendency toward cooperation, especially, because the network relationships betgween specialized firms may shift rapidly with changes in demand, with the same firms alternately subcontracting to one another.[87] Piore and Sabel describe the fluidity of supply chains in an industrial district:

The variability of demand meant that patterns of subcontracting were constantly rearranged. Firms that had underestimated a year's demand would subcontract the overflow to less well situated competitors scrambling to adapt to the market. But the next year the situation might be reversed, with winners in the previous round forced to sell off equipment to last year's losers. Under these circumstances, every employee could become a subcontractor, every subcontractor a manufacturer, every manufacturer an employee.[88]

With the decay of the first stage of the paleotechnic pseudomorph, flexible manufacturing has become the wave of the future—albeit still imprisoned within a centralized corporate framework. And better yet, networked, flexible manufacturing shows great promise for breaking through the walls of the old corporate system and becoming the basis of a fundamentally different kind of society.

If the Toyota Production System is an order of magnitude improvement in efficiency over mass production, H. Thomas Johnson in turn argues that networked local production on the Emilia-Romagna model is the ideal application of Ohno's lean principles. As amazing as Ohno's achievements were at Toyota, introducing his lean production methods within the framework of a transnational corporation amounted to putting new wine in old bottles. Ohno's lean production methods, Johnson argued, are ideally suited to a relocalized manufacturing economy. (This is another example of the decay of the cultural pseudomorph discussed in the previous chapter—the temporary imprisonment of lean manufacturing techniques in the old centralized corporate cocoon.)

In his Foreword to Waddell's and Bodek's *The Rebirth of American Industry* (something of a bible for American devotees of the Toyota Production System), Johnson writes:

> Some people, I am afraid, see lean as a pathway to restoring the large manufacturing giants the United States economy has been famous for in the past half century.
>
> ...The cheap fossil fuel energy sources that have always supported such production operations cannot be taken for granted any longer. One proposal that has great merit is that of rebuilding our economy around smaller scale, locally-focused organizations that provide just as high a standard living [sic] as people now enjoy, but with far less energy and resource consumption. Helping to create the sustainable local living economy may be the most exciting frontier yet for architects of lean operations. Time will tell.[89]

The "warehouses on wheels" (or "container ships") distribution model used by centralized manufacturing corporations, even "lean" ones like Toyota, is fundamentally at odds with the principles of lean production. Lean production calls for eliminating inventory by gearing production to orders on a demand-pull basis. But long distribution chains simply sweep the huge factory inventories of Sloanism under the rug, and shift them to trucks and ships. There's still an enormous inventory of

87 Piore and Sabel, "Italian Small Business Development," pp. 400-401.
88 Piore and Sabel, *Second Industrial Divide*, p. 32.
89 H. Thomas Johnson, "Foreword," William H. Waddell and Norman Bodek, *Rebirth of American Industry: A Study of Lean Management* (Vancouver, WA: PCS Press, 2005), p. xxi.

finished goods at any given time—it's just in motion.

Eric Husman of *GrimReader* blog, an enthusiastic advocate for lean production, has himself pointed to "warehouses on wheels" as just an outsourced version of Sloanist inventories:

> For another view of self-sufficiency—and I hate to beat this dead horse, but the parallel seems so striking—we have the lean literature on local production. In *Lean Thinking*, Womack et al discuss the travails of the simple aluminum soda can. From the mine to the smelter to the rolling mill to the can maker alone takes several months of storage and shipment time, yet there is only about 3 hours worth of processing time. A good deal of aluminum smelting is done in Norway and/or Sweden, where widely available hydroelectric power makes aluminum production from alumina very cheap and relatively clean. From there, the cans are shipped to bottlers where they sit for a few more days before being filled, shipped, stored, bought, stored, and drank. All told, it takes 319 days to go from the mine to your lips, where you spend a few minutes actually using the can. The process also produces about 24% scrap (most of which is recycled at the source) because the cans are made at one location and shipped empty to the bottler and they get damaged in transit. It's an astounding tale of how wasteful the whole process is, yet still results in a product that--externalities aside--costs very little to the end user. Could this type of thing be done locally? After all, every town is awash in a sea of used aluminum cans, and the reprocessing cost is much lower than the original processing cost (which is why Reynolds and ALCOA buy scrap aluminum).
>
> Taking this problem to the obvious conclusion, Bill Waddell and other lean consultants have been trying to convince manufacturers that if they would only fire the MBAs and actually learn to manufacture, they could do so much more cheaply locally than they can by offshoring their production. Labor costs simply aren't the deciding factor, no matter what the local Sloan school is teaching: American labor may be more expensive then [sic] foreign labor, but it is also more productive. Further, all of the (chimerical) gains to be made from going to cheaper labor are likely to be lost in shipping costs. Think of that flotilla of shipping containers on cargo ships between here and Asia as a huge warehouse on the ocean, warehouses that not only charge rent, but also for fuel.[90]

Regarding the specific example of aluminum cans, Womack et al speculate that the slow acceptance of recycling results from evaluating its efficiencies as a discrete step, rather than in terms of its effects on the entire production stream. If the rate of recycling approached 100%,

> interesting possibilities would emerge for the entire value stream. Mini-smelters with integrated mini-rolling mills might be located near the can makers in England, eliminating in a flash most of the time, storage, and distances involved today in the steps above the can maker.[91]

A similar dynamic might result from the proliferation of mini-mills scaled to local needs, with most of the steel inputs for small-scale industry supplied from recycled local scrap.

As Womack et al point out, lean production—properly understood—requires not only the scaling of machinery to production flow within the factory. It also requires scaling the factory to local demand, and siting it as close as possible to the point of consumption, in order to eliminate as much as possible of the "inventory" in trucks and ships. It is necessary "to locate both design and physical production in

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90 Husman, "Human Scale Part III--Self-Sufficiency," *GrimReader* blog, October 2, 2006 <http://www.zianet.com/ehusman/weblog/2006/10/human-scale-part-iii-self-sufficiency.html>.

91 James P. Womack and Daniel T. Jones, *Lean Thinking: Banish Waste and Create Wealth in Your Corporation* (Simon & Schuster, 1996), p. 43. In addition, recycling's slow takeoff may reflect a cost structure determined by the kind of standard, high-overhead bureaucratic organization which we saw dissected by Paul Goodman in Chapter Two. As recounted by Karl Hess and David Morris in *Neighborhood Power*, a neighborhood church group which set up a recycling center operated by local residents found they could sort out trash themselves and receive $20-50 a ton (this was in the mid-70s). Karl Hess and David Morris, *Neighborhood Power: The New Localism* (Boston: Beacon Press, 1975), p. 139.

the appropriate place to serve the customer."

> Just as many manufacturers have concentrated on installing larger and faster machines to eliminate the direct labor, they've also gone toward massive centralized facilities for product families... while outsourcing more and more of the actual component part making to other centralized factories serving many final assemblers. To make matters worse, these are often located on the wrong side of the world from both their engineering operations and their customers... to reduce the cost per hour of labor.
>
> The production process in these remotely located, high-scale facilities may even be in some form of flow, but... the flow of the product stops at the end of the plant. In the case of bikes, it's a matter of letting the finished product sit while a whole sea container for a given final assembler's warehouse in North America is filled, then sending the filled containers to the port, where they sit some more while waiting for a giant container ship. After a few weeks on the ocean, the containers go by truck to one of the bike firm's regional warehouses, where the bikes wait until a specific customer order needs filling often followed by shipment to the customer's warehouse for more waiting. In other words, there's no flow except along a tiny stretch of the total value stream inside one isolated plant.
>
> The result is high logistics costs and massive finished unit inventories in transit and at retailer warehouses.... When carefully analyzed, these costs and revenue losses are often found to more than offset the savings in production costs from low wages, savings which can be obtained in any case by locating smaller flow facilities incorporating more of the total production steps much closer to the customer.[92]
>
> To achieve the scale needed to justify this degree of automation it will often be necessary to serve the entire world from a single facility, yet customers want to get exactly the product they want exactly when they want it.... It follows that oceans and lean production are not compatible. We believe that, in almost every case, locating smaller and less-automated production systems within the market of sale will yield lower total costs (counting logistics and the cost of scrapped goods no one wants by the time they arrive) and higher customer satisfaction.[93]

Conclusion

Economic downturns, as we have seen, tend to increase the craft periphery at the expense of the mass-production core; and the long-term structural erosion of the mass-production economy, in the recent decades of stagnation, is leading to a permanent shift toward relocalized craft production.

Likewise, economic downturns, historically, have increased informal production at the expense of paid employment. And the permanent structural shifts of recent years are leading to a permanent shift of use-value creation outside the cash nexus, and to a shift of production from wage labor to the informal and household sector. That is the subject of our next C4SS paper.

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92 Womack, *Lean Thinking*, p. 64.
93 Ibid., p. 244.