CHINA MAKES, THE WORLD TAKES

A look inside the world’s manufacturing center shows that America should welcome China’s rise—for now.

BY JAMES FALLOWS

CONTAINERS READY FOR SHIPMENT from the port of Shenzhen

Photos by Michael Christopher Brown

From Atlantic Unbound:
Slideshow: "Made in China"
James Fallows narrates photos from the heart of the Chinese manufacturing dynamo.

Half the time I have spent in China I have spent in factories. At least that’s how it feels—and it’s a feeling I sought. The factories where more than 100 million Chinese men and women toil, and from which cameras, clothes, and every other sort of ware flow out to the world, are to me the most startling and intense aspect of today’s China. For now, they are also the most important. They are startling above all in their scale. I was prepared for the skyline of Shanghai and its 240-mph Maglev train to the airport, and for the nonstop construction, dust, and bustle of Beijing. Every account of modern China mentions them. But I had no concept of the sweep of what has become the world’s manufacturing center: the Pearl River Delta of Guangdong province (the old Canton region), just north of Hong Kong. That one province might have a manufacturing workforce larger than America’s. Statistics from China are largely guesses, but Guangdong’s population is around 90 million. If even one-fifth of its people hold manufacturing jobs, as seems likely in big cities, that would be 18 million—versus 14 million in the entire United States.

One facility in Guangdong province, the famous Foxconn works, sits in the middle of a conurbation just outside Shenzhen, where it occupies roughly as much space as a major airport. Some 240,000 people (the number I heard most often; estimates range between 200,000 and 300,000) work on its assembly lines, sleep in its
dormitories, and eat in its company cafeterias. I was told that Foxconn’s caterers kill 3,000 pigs each day to feed its employees. The number would make sense—it’s one pig per 80 people, in a country where pigs are relatively small and pork is a staple meat (I heard no estimate for chickens). From the major ports serving the area, Hong Kong and Shenzhen harbors, cargo ships left last year carrying the equivalent of more than 40 million of the standard 20-foot-long metal containers that end up on trucks or railroad cars. That’s one per second, round the clock and year-round—and it’s less than half of China’s export total. What’s in the containers that come back from America? My guess was, “dollars”; in fact, the two leading ship-borne exports from the United States to China, by volume, are scrap paper and scrap metal, for recycling.

And the factories are important, for China and everyone else. Someday China may matter internationally mainly for the nature of its political system or for its strategic ambitions. Those are significant even now, of course, but China’s success in manufacturing is what has determined its place in the world. Most of what has been good about China over the past generation has come directly or indirectly from its factories. The country has public money with which to build roads, houses, and schools—especially roads. The vast population in the countryside has what their forebears acutely lacked, and peasants elsewhere today still do: a chance at paying jobs, which means a chance to escape rural poverty. Americans complain about cheap junk pouring out of Chinese mills, but they rely on China for a lot that is not junk, and whose cheap price is important to American industrial and domestic life. Modern consumer culture rests on the assumption that the nicest, most advanced goods—computers, audio systems, wall-sized TVs—will get cheaper year by year. Moore’s Law, which in one version says that the price of computing power will be cut in half every 18 months or so, is part of the reason, but China’s factories are a big part too.

Much of what is threatening about today’s China also comes from its factories. Many people inside China, and nearly everyone outside, can avoid the direct effects of the country’s political controls. It is much harder to avoid its pollution. The air in Chinese cities is worse than I expected, and because the pollution affects so many people in such a wide range of places, it is more damaging than London’s, Manchester’s, or Pittsburgh’s in their worst, rapidly industrializing days. The air pollution comes directly from the steel works, cement plants, and other heavy-industry facilities that are helping the country prosper, and indirectly from the electric power plants that keep everything running. (Plus more and more cars, though China still has barely one-thirtieth as many per capita as the United States.) The sheer speed and volume with which factories and power plants across China increase their output of soot and gases make the country’s air-pollution problems the world’s. The heightened competition for oil, ore, and other commodities to feed the factories affects other nations, as do slapdash standards of food purity and safety, which may have led to tainted worldwide supplies of animal food. The ultimate fear in the developed world, of course, is that as China creates millions of new factory jobs unknown millions will lose such jobs in America, Canada, Germany, even Japan.

But these factories are both surprising and important in a less obvious, though also fundamental, way. Almost nothing about the way they work corresponds to the way they are discussed in the United States. America’s political debates about the “China opportunity” and, even more, the “China threat” seem distant, theoretical, and imprecise from the perspective of the factories where the outsourcing and exporting occur. The industrialists from the United States, Europe, or Japan who are deciding how much of their production to move to China talk about the process in very different terms from those used in American political discussion. One illustration: The artificially low value of China’s currency, relative to the dollar, comes near the top of American complaints about Chinese trade policy. (The currency is the yuan renminbi—literally, “people’s money”—or RMB). This is more like the eighth or tenth issue that comes up when business officials discuss the factories they are opening in one country and closing in another. And when it does come up, the context is usually whether the RMB’s rise will force a company to put its next factory not in China’s crowded coastal region but somewhere with even lower costs, like the remote interior provinces, where salaries are lower and commercial space is cheaper—or perhaps Vietnam or Cambodia.

So too with complaints about Chinese government subsidies for exporting industries, widespread abuse of intellectual property, and even “slave labor” inside the vast factories. Some of these complaints are well-founded, others are not; but even if all were true, they would misdescribe and undervalue what is going on here.
Talking about Chinese industrial growth, Americans are in the position of 19th-century Europeans who acted as if America’s industrial rise could be explained simply by its vast natural resources and its exploitation of immigrant and slave labor, plus its very casual attitude toward copyright and patent laws protecting foreign, mainly British, books and inventions. (Today, Americans walk the streets of China and see their movies, music, software, and books sold everywhere in cheap pirate versions. A century and a half ago, Charles Dickens walked the streets of young America and fumed to see his novels in cheap pirate versions.) All those factors played their part, but they were not the full story of America’s rise—nor do the corresponding aspects of modern China’s behavior fully explain what China has achieved.

I can’t pretend to know the complete story of China’s industrial rise. But I can describe what I have seen, and the main way it has changed my mind.

Large-scale shifts in economic power have effects beyond the purely economic. Americans need not be hostile toward China’s rise, but they should be wary about its eventual effects. The United States is the only nation with the scale and power to try to set the terms of its interaction with China rather than just succumb. So starting now, Americans need to consider the economic, environmental, political, and social goals they care about defending as Chinese influence grows.

The consideration might best start from the point about which I’ve changed my mind: So far, America’s economic relationship with China has been successful and beneficial—and beneficial for both sides. Free trade may not always be good for all participants, and in the long run trade with China may hold perils for the United States. But based on what I have seen in China, and contrary to what I expected before I came, so far it is working as advertised. Before thinking about what should be changed, Americans should appreciate what has gone right. A good place to begin that story is Shenzhen.

**HOW IT WORKS: THE VIEW FROM THE FOUR POINTS**

Each time I went to breakfast at the Sheraton Four Points in Shenzhen, I felt as if I were in a movie. I had a specific scene in mind: the moments aboard a U.S. aircraft carrier in a typical World War II movie when the flight crews gather in the wardroom to discuss the mission on which they’re about to embark.

The morning crowd at the Four Points has that same sort of anticipatory buzz. Shenzhen, which is the part of China immediately north of Hong Kong and its “New Territories,” did not exist as a city as recently as Ronald Reagan’s time in the White House. It was a fishing town of 70,000 to 80,000 people, practically unnoticeable by Chinese standards. Today’s other big coastal manufacturing centers, such as Xiamen, Guangzhou, Hangzhou, and Shanghai, were for centuries consequential Chinese cities. Not Shenzhen. Its population has grown at least a hundredfold in the past 25 years—rather than merely tripled or quadrupled, as in other cities. It is roughly as populous as New York, like many Chinese cities I keep coming across. Shenzhen has scores of skyscrapers and many, many hundreds of factories.

The story of Shenzhen’s boom is in a sense the first chapter in modern China’s industrialization. “During the founding period, Shenzhen people were bold and resolute in smashing the trammels of the old ideas,” says the English version of the city’s history, as recounted in Shenzhen’s municipal museum in an odd, modern-Chinese combination of Maoist bombast and supercapitalist perspective. “With the market-oriented reforms as the breakthrough point, they shook off the yoke of the planned economy, and gradually built up new management systems.”

What all this refers to is the establishment, in the late summer of 1980, of Shenzhen as a “special economic zone,” where few limits or controls would apply and businesses from around the world would be invited to set up shop. Shenzhen was attractive as an experimental locale, not just because it was so close to Hong Kong, with its efficient harbor and airport, but also because it was so far from Beijing. If the experiment went wrong, the consequences could be more easily contained in this southern extremity of the country. Nearly every rule that
might restrict business development was changed or removed in Shenzhen. Several free-trade processing zones were established, where materials and machinery coming in and exports going out would be exempt from the usual duties or taxes.

Modern Shenzhen has traits that Americans would associate with a booming Sun Belt city—transient, rough, unmannered, full of opportunity—and that characterized Manchester, Detroit, Chicago, Los Angeles at their times of fastest growth. Newspapers that cover Shenzhen are full of stories of drugs, crime, and vice in the most crowded tenement areas, where walls and sidewalks are covered with spray-painted phone numbers. Some are for prostitutes, but many are for vendors who can provide fake documents—health certificates, diplomas, residence credentials—for those seeking work.

The Sheraton Four Points is part of the process that keeps Shenzhen growing. It is one of the places foreigners go when they are ready to buy from China.

The foreigners in their 30s through 50s who come to Shanghai are often financiers, consultants, or lawyers. They tend to be lean, with good suits and haircuts. Those in Beijing are often diplomats, academics, or from foundations or NGOs. They look a little less polished. The scene in and around Shenzhen is different. It is an international group—Americans, Taiwanese, Europeans, Japanese—of a single class. Virtually all of them are designers, engineers, or buyers from foreign companies who have come to meet with Chinese factory owners. The Americans in the group tend to be beefier than the Shanghai-Beijing crowd, and more Midwestern-looking. Some wear company shirts or nylon jackets with their company’s logo on the pocket.

When the Four Points restaurant opens at 6:30 in the morning, foreigners begin assembling for breakfast, the meal when people most crave their native cuisine. It is laid out for all comers on a huge buffet: for the Europeans, sliced meats and cheese, good breads, strong coffee, muesli and yogurt. For the Japanese, pickles, sushi, cold noodles, smoked eel over rice. For the Taiwanese and other Chinese, steamed buns, dim sum, hot congee cereal. For the Americans, the makings of a Denny’s-style “Slam” breakfast: thick waffles, eggs, hash-brown potatoes, sausage and bacon and ham. My wife finally accused me of spending so much time in Shenzhen just for the breakfasts.

The room is noisy, as people discuss their plans for the day or meet the Chinese factory officials who will conduct them on their tours. The room empties dramatically by nine o’clock, as people go out to meet their drivers and vans, and the day’s factory touring and contract signing begin. As best I could tell from chatting with fellow guests, in all my trips to the Four Points, I was the only person there not on a buying mission.

Nearly every morning one man, a 41-year-old Irish bachelor, sits at the same table at the Four Points. Very late in the evening, he is at that table for dinner too. The table is near the entrance, from which the rest of the room can be surveyed. On a typical night, the company he owns will have 10 to 15 rooms booked at the hotel, for foreign visitors coming to do business with him. Often a few will join him for dinner. When the waiters see this man coming, they bring the plain Western food—meat, potatoes—they know he’s interested in. “Do you have the same thing every night?” I asked him when I saw the waiters’ reflexive response to his arrival. “I didn’t come here for the food,” he replied.

This man has lived in an apartment at the Four Points for the last two years, and in other hotels around Shenzhen for the previous eight. He makes a point of telling people that he does not speak Chinese—most business visitors who try, he says, have to work so hard to cope with the language that they forget what they’re negotiating about. But at useful points in meetings he drops in Chinese colloquialisms so that people must wonder whether in fact he has understood everything that has been said. (He tells me he hasn’t.) His name is Liam Casey, and I have come to think of him as “Mr. China.”
“Mr. China” is an established jokey honorific, like People magazine’s “Sexiest Man Alive—2003.” Since the days of Marco Polo, successive foreigners have competed informally for recognition as the person who really understands the country and can make things happen here. The hilarious 2005 memoir Mr. China, by Tim Clissold, describes the heartbreak and frustration of a young British financier who thought he could figure out the secrets of success in China when it was first opening up to Western commerce.

Liam Casey has succeeded where Tim Clissold was frustrated, but he is careful not to sound overconfident. “Just when you think you know what’s happening here, that’s when you’re in danger,” he says. “You see some new product on the market, and you wonder where it was made—and it turns out to be a factory you drove by every day for five years and never knew what was going on inside! You can be here so long and know so little.” But for my purposes he is Mr. China, because he is at the center of the overlapping flows of humanity bringing the world’s work to China.

When not dining or sleeping at the Four Points, Casey runs a company he owns outright, with 800 employees (50 of them are from Ireland, America, or one of a dozen other nations; the rest are Chinese) and sales last year of about $125 million. He is of medium height and fit-seeming in a compact way, with thick dark hair and a long face that generally has an impish expression. He has a strong Irish accent and dresses informally. He walks, talks, and moves so fast that I was generally scrambling to keep up.

Casey grew up on a farm outside Cork, had no formal education after high school, and first worked as a salesman in garment shops in Cork and then Dublin. He got involved in buying garments from Europe, with a friend set up a Crate & Barrel–style store in Ireland, then decided to travel. At age 29 he arrived in Southern California and worked briefly for a trading company. He says he would be in America still—“Laguna, Newport Beach, ah, I luvved it”—but he could not get a green card or long-term work permit, and didn’t want to try to stay there under the radar.

(I might as well say this in every article I write from overseas: The easier America makes it for talented foreigners to work and study there, the richer, more powerful, and more respected America will be. America’s ability to absorb the world’s talent is the crucial advantage no other culture can match—as long as America doesn’t forfeit this advantage with visa rules written mainly out of fear.)

So in 1996, just after he turned 30, Casey went to Taipei for an electronics trade show. It was his first trip to Asia, and, he says, “I could see this is where the opportunity was.” Within a year, he had set up operations in the
Shenzhen area and started the company now known as PCH China Solutions. The initials stand for Pacific Coast Highway, in honor of his happy Southern California days.

What does this company do? The short answer is outsourcing, which in effect means matching foreign companies that want to sell products with Chinese suppliers who can make those products for them. Casey describes his mission as “helping innovators leverage the manufacturing supply chain here in China.” To see how this works, consider the great human flows that now converge in southern China, which companies like Casey’s help mediate.

One is the enormous flow of people, mainly young and unschooled, from China’s farms and villages to Shenzhen and similar cities. Some come to the cities and then look for work. In the movie version of *Balzac and the Little Chinese Seamstress*, two teenaged men from the city befriend a young woman in the mountain village where they have been sent for rustication during the Cultural Revolution. One day the young woman unexpectedly leaves. She has gone to “try her luck in a big city,” her grandfather tells them. “She said she wanted a new life.” The new life is in Shenzhen. Multiplied millions of times, and perhaps lacking the specific drama of the *Balzac* tale, this is the story of the factory towns. As in the novel, many of the migrants are young women. In the light-manufacturing operations I have seen in the Pearl River Delta and around Shanghai, the workforce is predominantly female. Signing on with a factory essentially means making your job your life. Workers who come to the big coastal factory centers either arrive, like the little seamstress, before they have a spouse or children, or leave their dependents at home with grandparents, aunts, or uncles. At the electronics and household-goods factories, including many I’ve seen, the pay is between 900 and 1,200 RMB per month, or about $115 to $155. In the villages the workers left, a farm family’s cash earnings might be a few thousand RMB per year. Pay is generally lowest, and discipline toughest, at factories owned and managed by Taiwanese or mainland Chinese companies. The gigantic Foxconn (run by its founder, Terry Guo of Taiwan) is known for a militaristic organization and approach. Jobs with Western firms are the cushiest but are also rare, since the big European and American companies buy mainly from local subcontractors. Casey says that monthly pay in some factories he owns is several hundred RMB more than the local average. His goal is to retain workers for longer than the standard few-year stint, allowing them to develop greater skills and a sense of company spirit.

A factory work shift is typically 12 hours, usually with two breaks for meals (subsidized or free), six or seven days per week. Whenever the action lets up—if the assembly line is down for some reason, if a worker has spare
time at a meal break—many people place their heads down on the table in front of them and appear to fall asleep instantly. Chinese law says that the standard workweek is 40 hours, so this means a lot of overtime, which is included in the pay rates above. Since their home village may be several days’ travel by train and bus, workers from the hinterland usually go back only once a year. They all go at the same time—during the “Spring Festival,” or Chinese New Year, when ports and factories effectively close for a week or so and the nation’s transport system is choked. “The people here work hard,” an American manager in a U.S.-owned plant told me. “They’re young. They’re quick. There’s none of this ‘I have to go pick up the kids’ nonsense you get in the States.”

At every electronics factory I’ve seen, each person on an assembly line has a bunch of documents posted by her workstation: her photo, name, and employee number, often the instructions she is to follow in both English and Chinese. Often too there’s a visible sign of how well she’s doing. For the production line as a whole there are hourly totals of target and actual production, plus allowable and actual defect levels. At several Taiwanese-owned factories I’ve seen, the indicator of individual performance is a childish outline drawing of a tree with leaves. After each day’s shift one of the tree’s leaves is filled in with a colored marker, either red or green. If the leaf is green, the worker has met her quota and caused no problems. If it’s red, a defect has been traced back to her workstation. One red leaf per month is within tolerance; two is a problem.

As in all previous great waves of industrialization, many people end up staying in town; that’s why Shenzhen has grown so large. But more than was the case during America’s or England’s booms in factory work, many rural people, especially the young women, work for two or three years and then go back to the country with their savings. In their village they open a shop, marry a local man and start a family, buy land, or use their earnings to help the relatives still at home.

Life in the factories is obviously hard, and in the heavy- industry works it is very dangerous. In the same week that 32 people were murdered at Virginia Tech, 32 Chinese workers at a steel plant in the north were scalded to death when a ladleful of molten steel was accidentally dumped on them. Even in Chinese papers, that story got less play than the U.S. shooting—and fatal coal-mine disasters are so common that they are reported as if they were traffic deaths. By comparison, the light industries that typify southern China are tedious but less overtly hazardous. As the foreman of a Taiwanese electronics factory put it to me when I asked him about rough working conditions, “Have you ever seen a Chinese farm?” An American industrial designer who works in China told me about a U.S. academic who toured his factory and was horrified to see young female workers chained to their stations. What she saw was actually the grounding wire that is mandatory in most electronics plants. Each person on the assembly line has a Velcro band around her wrist, which is connected to the worktable to avoid a static- electricity buildup that could destroy computer chips.

That so many people are in motion gives Shenzhen and surrounding areas a rootless, transient quality. The natural language of southern China is Cantonese, but in the factory cities the lingua franca is Mandarin, the language that people from different parts of China are likeliest to share. “I don’t like it here,” a Chinese manager originally from Beijing told me, three years into a work assignment to Shenzhen. “There are no roots or culture.” “For the first few weeks I was here, I thought it was soulless,” Liam Casey says of the town that has been his home for 10 years. “But like any fast-moving place, the activity is the character. It’s like New York. You arrive at the airport and go downtown, and when you get out of that cab, no one knows where you came from. You could have been there one hour, you could have been there 10 years—no one can tell. It’s similar here, which makes it exciting.” Casey told me that, to him, Shanghai felt slow “and made for tourists.” Indeed, I am regularly surprised to find that people stroll rather than stride along the sidewalks of Shanghai: It’s a busy city with slow pedestrians. Or maybe Casey’s outlook is contagious.

Another great flow into Shenzhen and similar cities is of entrepreneurs who have come and set up factories. The point of the Shenzhen liberalizations was less to foster any one industry than to make it easy for businesses in general to get a start.
Many entrepreneurs attracted by the offer came from Taiwan, whose economy is characterized by small, mainly family-owned firms like those that now abound in southern China. Overall, mainland China’s development model is closer to Taiwan’s than to Japan’s or Korea’s. In all these countries and throughout East Asia, governments use many tools to maximize industrial output: tax policy, trading rules, currency values, and so on. But Japanese and Korean policy has tended to emphasize the welfare of large, national-champion firms—Mitsubishi and Toyota, Lucky Gold Star and Samsung—whereas Taiwan’s exporters have been thousands of small firms, a few of which grew large. China is, of course, vaster than the other countries combined, but its export-oriented companies are small. One reason for the atomization is pervasive mistrust and corruption, plus a shaky rule of law. Even Foxconn, China’s largest exporter, was only No. 206 on last year’s Fortune Global 500 list of the biggest companies in the world. When foreigners have trouble entering the Japanese or Korean markets, it is often because they run up against barriers protecting big, well-known local interests. The problem in China is typically the opposite: Foreigners don’t know where to start or whom to deal with in the chaos of small, indistinguishable firms.

For me, the fragmented nature of the Chinese system is symbolized by yet another of the stunning sights in Shenzhen: the SEG Electronics Market, a seven-story downtown structure whose every inch is crammed with the sales booths of hundreds of mom-and-pop electronics dealers. “Chips that I couldn’t dream of buying in the U.S., reels of rare ceramic capacitors that I only dream about at night!” Andrew “Bunnie” Huang, a Chinese-American electronics Ph.D. from MIT, wrote in his blog after a visit. “My senses tingle, my head spins. I can’t suppress a smirk of anticipation as I walk around the next corner, to see shops stacked floor to ceiling with probably a hundred million resistors and capacitors.” As he noted, “within an hour’s drive north” were hundreds of factories that could “take any electronics ideas and pump them out by the literal boatload.” The market is part permanent trade show, part supply stop for people who suddenly need some capacitors or connectors for a prototype or last-minute project, part swap meet where traders unload surplus components.

FACTORY WORKERS on their way to work in Shenzhen

One last flow coming into Shenzhen, which makes the other flows possible, is represented by the people at the Four Points: buyers from high-wage countries who have decided that they want to take advantage of, rather than compete with, low-cost Chinese manufacturers. This is where our Mr. China, and others like him, fit in. This is also where a veil falls. In decades of reporting on military matters, I have rarely encountered people as concerned about keeping secrets as the buyers and suppliers who meet in Shenzhen and similar cities. What information are they committed to protect? Names, places, and product numbers that would reveal which Western companies obtain which exact products from which Chinese suppliers. There are high- and low-road reasons for their concern.
The low-road reason is the “Nike problem.” This is the buyers’ wish to minimize their brands’ association with outsourcing in general and Asian sweatshops in particular, named for Nike’s PR problems because of its factories in Indonesia. By Chinese standards, the most successful exporting factories are tough rather than abusive, but those are not the standards Western customers might apply.

The high-road reason involves the crucial operational importance of the “supply chain.” It is not easy to find the right factory, work out the right manufacturing system, ensure the right supply of parts and raw material, impose the right quality standards, and develop the right relationship of trust and reliability. Companies that have solved these problems don’t want to tell their competitors how they did so. “Supply chain is intellectual property,” is the way Liam Casey put it. Asking a Western company to specify its Chinese suppliers is like asking a reporter to hand over a list of his best sources.

Because keeping the supply chain confidential is so important to buyers, they try to impose confidentiality on their suppliers. When an outside company’s reputation for design and quality is strong—Sony, Braun, Apple—many Chinese contractors like to drop hints that they are part of its supply chain. But the ones who really are part of it must be more discreet if they want to retain the buying company’s trust (and business).

So I will withhold details, but ask you to take this leap: If you think of major U.S. or European brand names in the following businesses, odds are their products come from factories like those I’m about to describe. The businesses are: computers, including desktops, laptops, and servers; telecom equipment, from routers to mobile phones; audio equipment, including anything MP3-related, home stereo systems, most portable devices, and headsets; video equipment of all sorts, from cameras and camcorders to replay devices; personal-care items and high-end specialty-catalog goods; medical devices; sporting goods and exercise equipment; any kind of electronic goods or accessories; and, for that matter, just about anything else you can think of. Some of the examples I’ll give come from sites in Shenzhen, but others are from facilities near Shanghai, Hangzhou, Guangzhou, Xiamen, and elsewhere.

Why does a foreign company come to our Mr. China? I asked Casey what he would tell me if I were in, say, some branch of the steel industry in Pittsburgh and was looking to cut costs. “Not interested,” he said. “The product’s too heavy, and you’ve probably already automated the process, so one person is pushing a button. It would cost you almost as much to have someone push the button in China.”

But what is of intense interest to him, he said, is a company that has built up a brand name and relationships with retailers, and knows what it wants to promote and sell next—and needs to save time and money in manufacturing a product that requires a fair amount of assembly. “That is where we can help, because you will come here and see factories that are better than the ones you’ve been working with in America or Germany.”

Here are a few examples, all based on real-world cases: You have announced a major new product, which has gotten great buzz in the press. But close to release time, you discover a design problem that must be fixed—and no U.S. factory can adjust its production process in time.

The Chinese factories can respond more quickly, and not simply because of 12-hour workdays. “Anyplace else, you’d have to import different raw materials and components,” Casey told me. “Here, you’ve got nine different suppliers within a mile, and they can bring a sample over that afternoon. People think China is cheap, but really, it’s fast.” Moreover, the Chinese factories use more human labor, and fewer expensive robots or assembly machines, than their counterparts in rich countries. “People are the most adaptable machines,” an American industrial designer who works in China told me. “Machines need to be reprogrammed. You can have people doing something entirely different next week.”
CHIP RESISTORS displayed in martini glasses at a booth inside the SEG Electronics Market in Shenzhen

Or: You are an American inventor with a product you think has “green” potential for household energy savings. But you need to get it to market fast, because you think big companies may be trying the same thing, and you need to meet a target retail price of $100. “No place but China to do this,” Mr. China said, as he showed me the finished product.

Or: You are a very famous American company, and you worry that you’ve tied up too much capital keeping inventory for retail stores at several supply depots in America. With Mr. China’s help, you start emphasizing direct retail sales on your Web site—and do all the shipping and fulfillment from one supply depot, run by young Chinese women in Shenzhen, who can ship directly to specific retail stores.

Over the course of repeated visits to Shenzhen—the breakfasts!—and visits to other manufacturing regions, I heard about many similar cases and saw some of the tools that have made it possible for Western countries to view China as their manufacturing heartland.

Some involve computerized knowledge. Casey’s PCH has a Google Earth–like system that incorporates what he has learned in 10 years of dealing with Chinese subcontractors. You name a product you want to make—say, a new case or headset for a mobile phone. Casey clicks on the map and shows the companies that can produce the necessary components—and exactly how far they are from each other in travel time. This is hard-won knowledge in an area where city maps are out of date as soon as they are published and addresses are approximate. (Casey’s are keyed in with GPS coordinates, discreetly read from his GPS-equipped mobile phone when he visits each factory.) If a factory looks promising, you click again and get interior and exterior photos, a rundown on the management, in some cases videos of the assembly line in action, plus spec sheets and engineering drawings for orders they have already filled. Similar programs allow Casey and his clients to see which ship, plane, or truck their products are on anywhere in the world, and the amount of stock on hand in any warehouse or depot. (How do they know? Each finished piece and almost every component has an individual bar code that is scanned practically every time it is touched.)

The factories whose workflow Casey monitors vary tremendously, though not in their looks. I’ve come to think that there is only one set of blueprints for factories in China: a big, boxy, warehouse-looking structure, usually made of concrete and usually five stories; white or gray outside; relatively large windows, which is how you can tell it from the workers’ dormitories; high ceilings, to accommodate machines. But inside, some are highly automated while some are amazingly reliant on hand labor. I’m not even speaking of the bad, dangerous, and
out-of-date factories frequently found in the north of China, where leftover Maoist-era heavy-industry hulks abound. Even some newly built facilities leave to human hands work that has been done in the West for many decades by machines. Imagine opening a consumer product—a mobile phone, an electric toothbrush, a wireless router—and finding a part that was snapped on or glued into place. It was probably put there by a young Chinese woman who did the same thing many times per minute throughout her 12-hour workday.

I could describe many installations, but I was fascinated by two. The first represents one extreme in automation. It is owned and operated by Inventec, one of five companies based in Taiwan that together produce the vast majority of laptop and notebook computers sold under any brand anywhere in the world. Everyone in America has heard of Dell, Sony, Compaq, HP, Lenovo-IBM ThinkPad, Apple, NEC, Gateway, Toshiba. Almost no one has heard of Quanta, Compal, Inventec, Wistron, Asustek. Yet nearly 90 percent of laptops and notebooks sold under the famous brand names are actually made by one of these five companies in their factories in mainland China. I have seen a factory with three “competing” brand names coming off the same line.

The Inventec installation I saw was in an export-processing zone in Shanghai specially created for the company, in which imported components for manufacturing and finished products for export were free of the usual duties or taxes. It turns out more than 30,000 notebook computers per day, under one of the brand names listed above. Each day, an Inventec plant on the same campus produces hundreds of large, famous-brand-name server computers to run Internet traffic.

This is today’s rough counterpart to the Ford Motor Company’s old River Rouge works. In the heyday of The Rouge, rubber, steel, and other raw materials would come into the plant, and finished autos would come out. Here, naked green circuit boards, capacitors, chip sets, and other components come in each day, and notebook computers come out. Some advanced components arrive already assembled: disk drives from Taiwan or Singapore, LCD screens from Korea or Japan, keyboards and power supplies from other plants in China.

The overall process looks the way you would expect a high-tech assembly line to. Conveyers and robots take the evolving computer from station to station; each unit arrives in front of a worker a split second after she has finished with the previous one. Before a component goes into a machine, its bar code is scanned to be sure it is the right part; after it is added, the machine is “check-weighed” to see that its new weight is correct. Hundreds of tiny transistors, chips, and other electronic parts are attached to each circuit board by “pick and place” robots, whose multiple arms move almost too fast to follow. The welds on the board are scanned with lasers for defects. Any with problems are set aside for women specialists, looking through huge magnifying glasses, to reweld. Why did this factory invest so much in robots and machine tools? I asked a supervisor from Taiwan. “People can’t do it precisely enough,” was his answer. These factories automate not what’s too expensive but what’s too delicate for human beings to perform.

Many of the notebook computers have been ordered online, and as they near completion each is “flavored” for its destination. The day I visited, one was going to Tokyo, with a Japanese keyboard installed and Japanese logos snapped into the right places on the case; the next one was headed for the United States. After display screens are installed, each computer rides on a kind of racetrack along the ceiling of the factory, where it runs for several hours to make sure that all components work. Then the conveyers carry it to the final flavoring step—the “burn in” of the operating system, which on my visit was Windows Vista, in many languages. One engineer pointed out that because Vista requires up to 10 times as much disk space as Windows XP, the assembly line had to be altered to allow a much longer, slower passage through the burn-in station.

The other facility that intrigued me, one of Liam Casey’s in Shenzhen, handled online orders for a different well-known American company. I was there around dawn, which was crunch time. Because of the 12-hour time difference from the U.S. East Coast, orders Americans place in the late afternoon arrive in China in the dead of night. As I watched, a customer in Palatine, Illinois, perhaps shopping from his office, clicked on the American company’s Web site to order two $25 accessories. A few seconds later, the order appeared on the screen 7,800 miles away in Shenzhen. It automatically generated a packing and address slip and several bar-code labels. One
young woman put the address label on a brown cardboard shipping box and the packing slip inside. The box moved down a conveyer belt to another woman working a “pick to light” system: She stood in front of a kind of cupboard with a separate open-fronted bin for each item customers might order from the Web site; a light turned on over each bin holding a part specified in the latest order. She picked the item out of that bin, ran it past a scanner that checked its number (and signaled the light to go off), and put it in the box. More check-weighing and rescanning followed, and when the box was sealed, young men added it to a shipping pallet.

By the time the night shift was ready to leave—8 a.m. China time, 7 p.m. in Palatine, 8 p.m. on the U.S. East Coast—the volume of orders from America was tapering off. More important, the FedEx pickup time was drawing near. At 9 a.m. couriers would arrive and rush the pallets to the Hong Kong airport. The FedEx flight to Anchorage would leave by 6 p.m., and when it got there, the goods on this company’s pallets would be combined with other Chinese exports and re-sorted for destinations in America. Forty-eight hours after the man in Palatine clicked “Buy it now!” on his computer, the item showed up at his door. Its return address was a company warehouse in the United States; a small MADE IN CHINA label was on the bottom of the box.

At 8 a.m. in Shenzhen, the young women on the night shift got up from the assembly line, took off the hats and hairnets they had been wearing, and shook out their dark hair. They passed through the metal detector at the door to their workroom (they pass through it going in and coming out) and walked downstairs to the racks where they had left their bikes. They wore red company jackets, as part of their working uniform—and, as an informal uniform, virtually every one wore tight, low-rise blue jeans with embroidery or sequins on the seams. Most of them rode their bikes back to the dormitory; others walked, or walked their bikes, chatting with each other. That evening they would be back at work. Meanwhile, flocks of red-topped, blue-bottomed young women on the day shift filled the road, riding their bikes in.

**GOOD FOR US—FOR NOW**

What should we make of this? The evidence suggests what I hadn’t expected: that the interaction has been good for most participants—so far.

Has the factory boom been good for China? Of course it has. Yes, it creates environmental pressures that, if not controlled, could pollute China and the world out of existence. The national government’s current Five Year Plan—the 11th, running through 2010—has as its central theme China’s development as a “harmonious society,” or hexie shehui, a phrase heard about as often from China’s leadership as “global war on terror” has been heard from America’s. In China, the phrase is code for attempting to deal with income inequalities, especially the hardships of farmers and millions of migrant laborers. But it is also code for at least talking about protecting the environment.

And, yes, throughout China’s boom many people have been mistreated, oppressed, sometimes worked to death in factories. Even those not abused may be lonely and lost, with damaging effects on the country’s social fabric. But this was also the story of Britain and America when they built their great industries, their great turbulent industrial cities, and ultimately their great industrial middle classes. For China, it is far from the worst social disruption the country has endured in the last 50 years. At least this upheaval, unlike the disastrous Great Leap Forward of the 1950s and Cultural Revolution of the ’60s and early ’70s, has some benefits for individuals and the nation.

Some Westerners may feel that even today’s “normal” Chinese working conditions amount to slave labor—$100 a month, no life outside the factory, work shifts so long there’s barely time to do more than try to sleep in a jam-packed dormitory. Here is an uncomfortable truth I’m waiting for some Chinese official to point out: The woman from the hinterland working in Shenzhen is arguably better off economically than an American in Chicago living on minimum wage. She can save most of what she makes and feel she is on the way up; the American can’t and doesn’t. Over the next two years, the minimum wage in the United States is expected to rise to $7.25 an hour. Assuming a 40-hour week, that’s just under $1,200 per month, or about 10 times the Chinese
factory wage. But that’s before payroll deductions and the cost of food and housing, which are free or subsidized in China’s factory towns.

Chinese spokesmen do make a different point about their economy, and they rattle it off so frequently that Western audiences are tempted to dismiss it. They say, “Whatever else we have done, we have brought hundreds of millions of people out of poverty.” That is true, it is important, and the manufacturing export boom has been a significant part of how China has done it. This economic success obviously does not justify everything the regime has done, especially its crushing of any challenge to one-party rule. But the magnitude of the achievement can’t be ignored. For all of the billions of dollars given in foreign aid and supervised by the World Bank, the greatest good for the greatest number of the world’s previously impoverished people in at least the last half century has been achieved in China, thanks largely to the outsourcing boom.

Has the move to China been good for American companies? The answer would seemingly have to be yes—otherwise, why would they go there? It is conceivable that bad partnerships, stolen intellectual property, dilution of brand name, logistics nightmares, or other difficulties have given many companies a sour view of outsourcing; I have heard examples in each category from foreign executives. But the more interesting theme I have heard from them, which explains why they are willing to surmount the inconveniences, involves something called the “smiley curve.”

The curve is named for the U-shaped arc of the 1970s-era smiley-face icon, and it runs from the beginning to the end of a product’s creation and sale. At the beginning is the company’s brand: HP, Siemens, Dell, Nokia, Apple. Next comes the idea for the product: an iPod, a new computer, a camera phone. After that is high-level industrial design—the conceiving of how the product will look and work. Then the detailed engineering design for how it will be made. Then the necessary components. Then the actual manufacture and assembly. Then the shipping and distribution. Then retail sales. And, finally, service contracts and sales of parts and accessories.

The significance is that China’s activity is in the middle stages—manufacturing, plus some component supply and engineering design—but America’s is at the two ends, and those are where the money is. The smiley curve, which shows the profitability or value added at each stage, starts high for branding and product concept, swoops down for manufacturing, and rises again in the retail and servicing stages. The simple way to put this—that the real money is in brand name, plus retail—may sound obvious, but its implications are illuminating.

At each factory I visited, I asked managers to estimate how much of a product’s sales price ended up in whose hands. The strength of the brand name was the most important variable. If a product is unusual enough and its brand name attractive enough, it could command so high a price that the retailer might keep half the revenue. (Think: an Armani suit, a Starbucks latte.) Most electronics products are now subject to much fiercer price competition, since it is so easy for shoppers to find bargains on the Internet. Therefore the generic Windows-style laptops I saw in one modern factory might go for around $1,000 in the United States, with the retailer keeping less than $50.

Where does the rest of the money go? The manager of that factory guessed that Intel and Microsoft together would collect about $300, and that the makers of the display screen, the disk-storage devices, and other electronic components might get $150 or so apiece. The keyboard makers would get $15 or $20; FedEx or UPS would get slightly less. When all other costs were accounted for, perhaps $30 to $40—3 to 4 percent of the total—would stay in China with the factory owners and the young women on the assembly lines.

Other examples: A carrying case for an audio device from a big-name Western company retails for just under $30. That company pays the Chinese supplier $6 per case, of which about half goes for materials. The other $24 stays with the big-name company. An earphone-like accessory for another U.S.-brand audio device also retails for about $30. Of this, I was told, $3 stayed in China. I saw a set of high-end Ethernet connecting cables. The cables are sold, with identical specifications but in three different kinds of packaging, in three forms in the United States: as a specialty product, as a house brand in a nationwide office-supply store, and with no brand
over eBay. The retail prices are $29.95 for the specialty brand, $19.95 in the chain store, and $15.95 on eBay. The Shenzhen-area company that makes them gets $2 apiece.

In case the point isn’t clear: Chinese workers making $1,000 a year have been helping American designers, marketers, engineers, and retailers making $1,000 a week (and up) earn even more. Plus, they have helped shareholders of U.S.-based companies.

All this is apart from a phenomenon that will be the subject of a future article: China’s conversion of its trade surpluses into a vast hoard of dollar-denominated reserves. Everyone understands that in the short run China’s handling of its reserves has been a convenience to the United States. By placing more than $1 trillion in U.S. stock and bond markets, it has propped up the U.S. economy. Asset prices are higher than they would otherwise be; interest rates are lower, whether for American families taking out mortgages or for American taxpayers financing the ever-mounting federal debt. The dollar has also fallen less than it otherwise would have—which in the short run helps American consumers keep buying Chinese goods.

Everyone also understands that in the long run China must change this policy. Its own people need too many things—schools, hospitals, railroads—for it to keep sending its profits to America. It won’t forever sink its savings into a currency, the dollar, virtually guaranteed to keep falling against the RMB. This year the central government created a commission to consider the right long-term use for China’s reserves. No one expects the recommendation to be: Keep buying dollars. How and when the change will occur, what it will be, and what consequences it will have, is what everyone would like to know.

One other aspect of China’s development to date has helped American companies in their dealings with it. This is the fact that China, so far, has been different in crucial ways from America’s previous great Asian challenger: Japan. Americans have come to view the Japanese economy as a kind of joke, mainly because the Tokyo Stock Exchange has been in a slump for nearly 20 years. Nonetheless, Japan remains the world’s second-largest economy. Toyota has overtaken General Motors to become the largest automaker; Japan’s exporters have continually increased their sales of electronics and other high-value goods; and the long-standing logic of the Japanese system, in which consumers and investors suffer so that producers may thrive, remains intact.

Japan was already a rich and modern country, as China still is not, by the time trade friction intensified, in the 1980s. More important, its leading companies were often competing head-to-head with established high-value, high-tech companies in the United States: Fujitsu against IBM, Toshiba against Intel, Fuji against Kodak, Sony and Matsushita against Motorola, and on down the list. Gains for Japanese companies often meant direct losses for companies in America—whether those companies were seen as stodgy and noninnovative, like the Detroit firms, or technologically agile and advanced, like the semiconductor makers.

For the moment, China’s situation is different. Its companies are numerous but small. Lenovo and Qingdao are its two globally recognized brand names. But Lenovo is known mainly because it bought the ThinkPad brand from IBM, and a quarter of Qingdao Beer is owned by Anheuser-Busch. Chinese exporters have done best when working for, rather than against, Western companies, as Foxconn (like numerous smaller firms) has in working with Apple. While the Chinese government obviously wants to strengthen the country’s brands—for instance, with an aircraft company it hopes will compete with Boeing and Airbus—its “industrial planning” has mainly taken the form not of specific targeting but of general business promotion, as with the incentives that brought companies to Shenzhen.

China’s economy, technically still socialist, has also been strangely more open than Japan’s. Through its first four decades of growth after World War II, Japan was essentially closed to foreign ownership and investment. (Texas Instruments and IBM were two highly publicized exceptions to the rule.) China’s industrial boom, by contrast, is occurring during the age of the World Trade Organization, to which it was admitted in 2001. Under WTO rules, China is obliged to open itself to foreign investment and ownership at a much earlier stage of its development than Japan did. Its export boom has been led by foreign firms. China is rife with intellectual piracy,
hidden trade barriers, and other impediments. But overall it is harder for foreign economies or foreign companies to claim damage from China’s trade policies than from Japan’s.

When I was living in Japan through its boom of the late ’80s, I argued in this magazine that its behavior illustrated some great historic truths that economic models cannot easily include. Sometimes societies pursue goals other than the one economists consider rational: the greatest possible growth of consumer well-being. This has been true of America mainly during wartime, but also when it has pursued martial-toned projects thought to be in the nation’s interest: building interstate highways, sending men into space, perhaps someday developing alternative energy supplies. In a more consistent way, over decades, this has been true of Japan.

For anyone who has taken EC101, the natural response would be: That’s their problem! They’re making high-quality products for everyone else, so what’s not to like? But in the past decade, a growing number of respectable economists have argued that the situation is not that simple. If one nation deliberately promotes high-tech and high-value industries, it can end up with more of those industries, and more of the high-wage jobs that go with them, than it would have otherwise. This is not economically “rational”—European countries have paid heavily for each job they have created through Airbus. But Boeing sells fewer airplanes and employs fewer engineers than it presumably would without competition from Airbus. The United States does not have to emulate Europe’s approach, or Japan’s. But it needs to be aware of them, and of the possible consequences. (With different emphases, Paul Samuelson of MIT, Alan Blinder and William Baumol of Princeton, and Ralph Gomory, head of the Alfred P. Sloan Foundation, have advanced this argument.)

China’s behavior, and that of its companies, is easier to match with standard economic theories than Japan’s. So far, deals like those struck at the Sheraton Four Points have been mainly good for all parties. Chinese families have new opportunities in life. American customers have wider choices. American investors have better returns. But, of course, there are complications.

First is the social effect visible around the world, which in homage to China’s Communist past we can call “intensifying the contradictions.” Global trade involves one great contradiction: The lower the barriers to the flow of money, products, and ideas, the less it matters where people live. But because most people cannot move from one country to another, it will always matter where people live. In a world of frictionless, completely globalized trade, people on average would all be richer—but every society would include a wider range of class, comfort, and well-being than it now does. Those with the most marketable global talents would be richer, because they could sell to the largest possible market. Everyone else would be poorer, because of competition from a billions-strong labor pool. With no trade barriers, there would be no reason why the average person in, say, Holland would be better off than the average one in India. Each society would contain a cross section of the world’s whole income distribution—yet its people would have to live within the same national borders.

We’re nowhere near that point. But the increasing integration of the American and Chinese economies pushes both countries toward it. This is more or less all good for China, but not all good for America. It means economic benefits mainly for those who have already succeeded, a harder path up for those who are already at a disadvantage, and further strain on the already weakened sense of fellow feeling and shared opportunity that allows a society as diverse and unequal as America’s to cohere.

A further problem is that China’s business and governmental leaders are all too aware of how the smiley curve affects them. Yes, it’s better to have jobs that pay $1,000 a year than none at all. But it would be better still to have jobs that pay many times as much and are at more desirable positions along the curve. If the United States were in China’s position, it would be doing everything possible to bring more high-value work within its borders—and that, of course, is what China is trying to do. Everywhere you turn you see an illustration.

Just a few: In the far north of China, Intel has just agreed to build a major chip-fabrication plant, with high-end engineering and design jobs, not just seats on the assembly line. In Beijing, both Microsoft and Google have opened genuine research centers, not just offices to serve the local market. Down in Shenzhen, Liam Casey’s
company is creating industrial-design centers, where products will be conceived, not just snapped together. What was recently a factory zone in Shanghai is being gentrified; local authorities are pushing factories to relocate 10 miles away, so their buildings can be turned into white-collar engineering and design centers.

At the moment, most jobs I’ve seen the young women in the factories perform have not been “taken” from America, because in America these assembly-type tasks would be done by machines. But the Chinese goal is, of course, to build toward something more lucrative.

Many people I have spoken with say that the climb will be slow for Chinese industries, because they have so far to go in bringing their design, management, and branding efforts up to world standards. “Think about it—global companies are full of CEOs and executives from India, but very few Chinese,” Dominic Barton, the chairman of McKinsey’s Asia Pacific practice, told me. The main reason, he said, is China’s limited pool of executives with adequate foreign-language skills and experience working abroad. Andy Switky, the managing director–Asia Pacific for the famed California design firm IDEO, described a frequent Chinese outlook toward quality control as “happy with crappy.” This makes it hard for them to move beyond the local, low-value market. “Even now in China, most people don’t have an iPod or a notebook computer,” the manager of a Taiwanese-owned audio-device factory told me. “So it’s harder for them to think up improvements, or even tell a good one from a bad one.” These and other factors may slow China’s progress. But that’s a feeble basis for American hopes.

The measures Americans most often discuss for dealing with China are not much better as a long-term basis for hope. Yes, the RMB is now undervalued against the dollar. Yes, that makes Chinese exports cheaper than they would otherwise be. And yes, the RMB’s value should rise—and it will. But at no conceivable level would it bring those Shenzhen jobs back to Ohio. At best it would make U.S. exports, from locomotives and high-tech medical equipment to wine and software, more attractive. Such commercial victories are important, but they are unlikely to be advanced by threats of retaliatory tariffs if China does not speed the RMB’s climb. Also, the faster the dollar falls against the RMB, the faster Chinese authorities might move their assets out of dollars to stronger currencies.

This year the U.S. government imposed special tariffs, called countervailing duties, on imports of glossy paper from China. This is the kind of paper used to print magazines and catalogs, and Chinese exports of it to the United States rose tenfold from 2004 to 2006. The U.S. government said the duties were necessary to offset the export subsidies Chinese manufacturers receive via low-cost loans, tax breaks, and other benefits. Under WTO rules, export subsidies of all sorts are prohibited; U.S. officials, academics, and trade groups have prepared lists of de facto subsidies that cut the price of Chinese goods to U.S. consumers by 25 percent, 40 percent, and even more. (The Chinese—like the Europeans, Australians, and others—are quick to retort that the United States subsidizes many products too, especially exports from large-scale farms.)

This is obviously significant. But think again of those Ethernet connectors that retail for $29.95 and cost only $2 to make. Removing all imaginable subsidies might push the manufacturing cost to $3. Suppose it went to $4. That would have a big effect on decisions made by corporations that outsource to China—Can they raise the retail price? Must they just accept a lower margin? Should they build the next factory in Vietnam?—but it would not make anyone bring production back to the United States.

Government policy and favoritism may play a big role in China’s huge road-building and land-development policies, but they seem to be secondary factors in the outsourcing boom. For instance, when I asked Mr. China which officials I should try to interview in the local Shenzhen government to understand how they worked with companies, he said he didn’t know. He’d never met any.

American complaints about the RMB, about subsidies, and about other Chinese practices have this in common: They assume that the solution to long-term tensions in the trading relationship lies in changes on China’s side. I think that assumption is naive. If the United States is unhappy with the effects of its interaction with China, that’s America’s problem, not China’s. To imagine that the United States can stop China from pursuing its own
economic ambitions through nagging, threats, or enticement is to fool ourselves. If a country does not like the terms of its business dealings with the world, it needs to change its own policies, not expect the world to change. China has done just that, to its own benefit—and, up until now, to America’s.

Are we uncomfortable with the America that is being shaped by global economic forces? The inequality? The sense of entitlement for some? Of stifled opportunity for others? The widespread fear that today’s trends—borrowing, consuming, looking inward, using up infrastructure—will make it hard to stay ahead tomorrow, particularly in regard to China? If so, those trends themselves, and the American choices behind them, are what Americans can address. They’re not China’s problem, and they’re not the fault of anyone in Shenzhen.

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