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# In N.C., A Second Industrial Revolution

Biotech Surge Shows Manufacturing Still Key to U.S. Economy

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Monday, September 3, 2007; A01

PITTSBORO, N.C. -- Until the late 1950s, the low-slung brick building in the center of this minuscule town was home to the Kayser-Roth hosiery mill. Some 400 workers tended to clattering looms, churning out pantyhose.

"It was the best employer in town," said Nancy May, a former worker.

The hosiery mill is gone now, along with much of the Carolina textile industry -- a casualty of the global reordering that has concentrated production in Asia and Latin America. But the old brick building is still here and still making products -- albeit modern varieties that could scarcely have been imagined a half-century ago: Today, the site is occupied by a biotechnology company, Biolex Therapeutics.

Inside, 90 workers harness expensive laboratory equipment and a plant called duckweed, a bane to local ponds, to develop a drug for a serious liver ailment. Even the lowest-paid lab technician takes home far more than the seamstresses earned. If the start-up succeeds, its product will be substantially more lucrative than pantyhose.

As lawmakers pursue legislation aimed at softening the blow from factory closures, and as the downside of trade emerges as a talking point in the 2008 presidential campaign, it might seem that manufacturing is a dying part of the U.S. economy. But the retooling of this old brick building on Credle Street underscores how, despite its oft-pronounced demise, American manufacturing is in many regards stronger than ever.

The United States makes more manufactured goods today than at any time in history, as measured by the dollar value of production adjusted for inflation -- three times as much as in the mid-1950s, the supposed heyday of American industry. Between 1977 and 2005, the value of American manufacturing swelled from $1.3 trillion to an all-time record $4.5 trillion, according to the Bureau of Economic Analysis.

With less than 5 percent of the world's population, the United States is responsible for almost one-fourth of global manufacturing, a share that has changed little in decades. The United States is the largest manufacturing economy by far. Japan, the only serious rival for that title, has been losing ground. China has been growing but represents only about one-tenth of world manufacturing.

But if the big picture is brighter than many realize, American manufacturing is nevertheless undergoing fundamental change that is exerting enormous pressure on workers.

Imports are rising, now representing a third of all manufactured goods consumed in the country, up from 10 percent in the 1970s.

American exports are rising even faster than imports, but companies face intense price competition, with China, India, Brazil and dozens of other low-wage countries now part of a global marketplace for labor and materials. Manufacturers are redesigning production lines to make them more efficient, substituting machinery for people wherever possible.

So while American manufacturing is not declining, manufacturing employment has been shrinking dramatically. After peaking in 1979 at 19 million workers, the American manufacturing workforce has since dropped to 14 million, the lowest number since 1950.

A stark educational divide has emerged on the factory floor, as skills and training separate winners from losers. In 1973, more than half of all American manufacturing workers failed to complete high school, and only 6 percent attended some college, according to the National Association of Manufacturers. By 2001, nearly half completed high school and one-fourth attended some college.

North Carolina encapsulates the forces remaking American manufacturing. Between 2002 and 2005, the state lost 72,000 manufacturing jobs, about three-fourths in textiles, furniture-making and electronics, according to the North Carolina Commission on Workforce Development. At the same time, the state has become a rising powerhouse in lucrative new manufacturing sectors such as biotechnology, pharmaceuticals and sophisticated textiles.

As they grapple with change, North Carolina's workers and factory owners are helping answer a pressing question: What does the future hold for manufacturing in the United States?

**Adapting to a New Market**

"We didn't see it coming," the furniture man grimly declared.

Michael K. Dugan once ran Henredon Furniture Industries, which operated a plant in Spruce Pine, a former mining town in the rugged mountains in the western part of the state. There the company made hand-carved wooden bedroom furniture, once employing more than 1,000 people. Many lacked high school diplomas and some were illiterate, yet the factory provided a way for these workers to support families and to acquire modest homes and cars. It paid roughly $14 an hour, plus health and pension benefits.

Henredon's four-poster beds retailed for about $5,000 in the early 1990s, Dugan recalled. A few years later, similar models started showing up from the Philippines for less than $2,000. Now they can be found for $799, produced by workers in southern China who earn as little as 40 cents an hour.

Henredon first trimmed its workforce. Three years ago, it shut down the plant, eliminating the last 350 positions and adding to a wave of layoffs in surrounding Mitchell County, which has had roughly one-fifth of its jobs wiped out since 2000, according to the Employment Security Commission of North Carolina.

Many of the storefronts in Spruce Pine's brick downtown are empty. Restaurants and shops have closed, succumbing to a dearth of local spending power.

"The kids are moving out," said Brenda Smith, a youth pastor at a teen center. "They can't find anywhere to work. There's Wal-Mart, and that's about it."

For 26 years, Phillip Wilson worked at Henredon as a master carver. Now, on most days, he wakes before dawn and drives to his new job -- the 5:30 a.m. shift as a prison guard at the medium-security Mountain View correctional facility. His pay is down 15 percent, forcing him into a second job at a used-appliance store to make ends meet.

Throughout the state, and indeed the nation, laid-off factory workers are typically able to find new jobs but mostly for lower pay. A June 2002 study published by the North Carolina Justice and Community Development Center found that workers who lost manufacturing jobs in 1999 and 2000 were earning 72 percent of their previous salaries six months later.

Furniture-making is typical of the manufacturing sectors that are shrinking in the United States. For many, labor represents a relatively high proportion of total costs, making them vulnerable to foreign competition. If factories cannot automate, they die.

The textile industry has been particularly aggressive in replacing people with machines. A half-century ago, a typical North Carolina textile worker operated five machines at once, each capable of running a thread through a loom at 100 times a minute. Now machines run six times as fast, and one worker oversees 100 of them.

With machines increasingly occupying the center of production, manufacturers want highly trained, literate workers at the controls. To meet the demand and help workers secure jobs, North Carolina has beefed up course offerings at its community colleges.

Three years ago, it set up Bionetwork, a training program based in community colleges, to feed workers into the state's growing biotech sector.

"All of the skills are closely tied to the workplace," said Norman Smit, Bionetwork's recruitment director.

Smit seeks students from declining areas of manufacturing. Given intensive training and a willingness to adapt, a textile or furniture worker can become a better-paid biotech technician, he says. As proof, he points to Regina Whitaker.

Ten years ago, straight out of high school, Whitaker went to work at a yarn texturing plant in Yadkinville, in the Piedmont region. Her mother had worked there for 30 years.

From midnight until 8 a.m., Whitaker tended to whirring machinery, alternately wishing for another job and worrying that she would actually have to find one: Her company was opening plants in China and Brazil and laying people off in Yadkinville.

"I couldn't see spending my life there," Whitaker said.

In January 2003, she enrolled in the first associate degree classes offered in biotechnology at Forsyth Technical Community College. Now 28, she graduated in July 2004 and was hired as a lab technician at Targacept, a biotech start-up in Winston-Salem that was spun off from R.J. Reynolds Tobacco. Where the tobacco giant had researched the use of nicotine to make people crave cigarettes, Targacept is focusing on the nicotine receptors in the brain to develop drugs for Alzheimer's disease and schizophrenia.

Whitaker said her salary is "significantly more" than the $13.40 an hour she made at the yarn factory.

"I'm not struggling now," she said. "Before, it was paycheck to paycheck."

**Textile Firm Finds a Niche**

Glen Raven Custom Fabrics was another Carolina textile operation whose future seemed in doubt. In the early 1990s, the company was still concentrated on products under siege from foreign competition -- pantyhose, luggage fabric and yarn for apparel. Throughout the Carolinas, other textile companies were vanishing.

Glen Raven managed to endure and prosper by refocusing on specialty industrial fabrics for outdoor furniture, boats and awnings -- expensive goods that require customization, high-end machinery and technical expertise.

Economists suggest this is the future for successful U.S. manufacturers: zeroing in on high-value products that tap America's technological advantages to offset high labor costs. This strategy has fostered a boom in exports of American-made industrial engines and machinery, aerospace gear and pharmaceuticals.

North Carolina has embraced this approach, aggressively pushing biotechnology development. In the past decade, the number of biosciences firms in the state has jumped to 386 from 131, and the number of workers has more than doubled from 20,000 to 47,000, according to the North Carolina Biotechnology Center, a government arm that promotes the industry.

At Research Triangle Park, a sprawling complex outside Raleigh-Durham, Biogen Idec has established one of the larger biomanufacturing facilities in the United States, making sophisticated pharmaceuticals. Entry-level workers with the necessary training earn $27,000 to $35,000 a year. Experienced production workers can make considerably more.

For Glen Raven, the focus on high-technology production has turned its factory floors into lonely expanses. In Norlina, N.C., a red-brick factory just down Route 1 from the town's lone traffic light, 225 people once made pantyhose, pushing baskets of nylon across the floor by hand. Now, 156 workers man computers that control acres of robotic arms and bobbins producing yarn.

The refashioning has positioned Glen Raven to profit from what many portray as the mortal threat to the Carolina textile industry: China now buys growing volumes of the company's products. Last year, North Carolina exported $52 million of textiles and fabrics to China, a fivefold increase from 2003.

Chinese factories increasingly use Glen Raven's fabrics to make sun umbrellas and upholstery for lounge chairs, sending many of these finished goods back across the Pacific to the United States.

The workers at these Chinese factories typically make less in a month than the price of a sun umbrella at an American retailer. Glen Raven's success allows the company to pay its American workers $10.50 to $22 an hour, plus benefits. Even at those wages, labor represents only 5 percent of the overall cost of turning fiber into fabric.

Put another way, the efficiency of the machines that have eliminated jobs at its plants has allowed Glen Raven to pay the remaining workers enough to afford cars, health care and homes. Some of those homes boast patios and lawns now shaded by sun umbrellas made in China using fabric woven just down the road.

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