The decline and fall of U.S. steel: a case study in de-industrialization

by Lydia Schulman

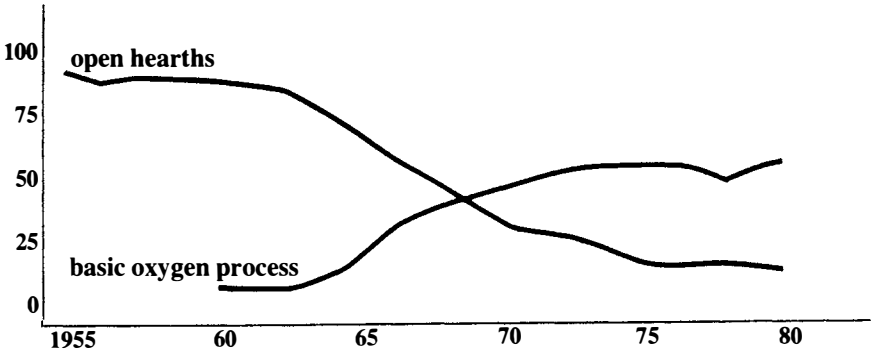
If the United States were to embark on a serious economic recovery program, one of the first bottlenecks would be its shrinking, antiquated steel industry. In fact, to gear up the economy, it would be necessary to begin importing steel on a large scale—much as America did from 1971 to 1974, the last period of relative economic growth.

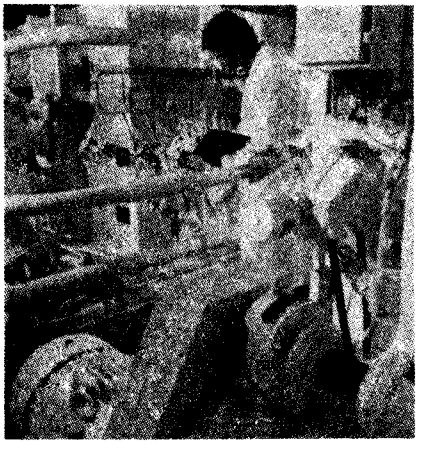
The U.S. steel industry is currently producing at around 40 percent of capacity utilization, a rate lower than the average level during the worst four years of the Great Depression, 1932 to 1935. Its shipments collapsed by approximately one third during the first five months of 1982 compared with the previous year, as auto, construction, capital goods, the railroads, the oil and gas industry, and other major steel users succumbed to Federal Reserve Chairman Paul Volcker's high interest-rate policy.

Industry employment is currently lower than at the depths of the last Depression. At the end of the first quarter, the industry employed 234,000 hourly production workers, compared with 339,000 in 1978 and a high of 544,000 in 1953—statistics that mean that America's highly skilled work force is being permanently lost to lower-skilled jobs and welfare.

U.S. steelmaking capacity has shrunk from a peak of around 168 million tons per annum (of raw steel) in the mid-1960s to an estimated 151 million tons at present. Most of this capacity—high-cost, outmoded facilities that should have been replaced years earlier—has been shut down since the first quarter of 1975, when the full effects of the Oil Hoax and recession hit. The U.S. Commerce Department is projecting a slight net increase in capacity over the 1980s through "rounding out" programs and improved efficiencies. However, the economists admit that this projection depends on how much more capacity is shut down in the coming months and years. They anticipate that more of Bethlehem's Lacka-

Figure 1
Raw steel production in the United States by furnace type, 1955 to the present





This graph shows the replacement of open hearth furnaces, a 19th century technology, by the basic oxygen process, a more sophisticated technology which uses pressurized oxygen blown into the furnace to catalyze the refining process. This replacement accounted for a sizeable jump in steel making productivity beginning in the 1960s. Note how the installation of BOP furnaces leveled off in the 1970s, and how open hearths persisted. In 1978, 15 percent of U.S. steel was still being produced by open hearth furnaces, after Japan had torn down the last of its open hearths.

wanna, New York plant will be closed, along with more of U.S. Steel's Homestead, Pennsylvania plant and even some of its newer Fairless Works in Alabama.

U.S. Steel, the industry leader, is notorious for its policy of "diversifying" out of steel—to the point where only one-third of its sales are now in steel. Real estate, chemicals, and oil and gas (following U.S. Steel's $4 billion purchase of Marathon Oil earlier this year) make up the bulk. Other companies, including Bethlehem—the number two firm—have adopted a policy of not investing one cent more in older plants and equipment, literally running their assets into the ground before junking them. According to a survey of various Wall Street analysts, U.S. steel capacity could be reduced by as much as 40 percent over the next several years. In other words, American steel production could be permanently held as low as the current depressed levels.

The more serious problem, indeed, the root of the current crisis, is the American steel industry's miserable record of capital investment. In the 1970s, steel capacity was being replaced at a rate of only 2.5 percent per year—a capital-replacement cycle of 40 years, the worst of any industry in the economy. What money was spent went into piecemeal modernization of aging plants—the replacement of a furnace here, a rolling or stamping mill there. As a result, U.S. steelmaking capacity stagnated quantitatively and qualitatively. And steelmakers had to pay the price of diverting an increasing share of outlays—now around 20 percent—to nonproductive, antipollution devices for antiquated plants.

The Japanese, by contrast, built entirely new, "greenfield" plants, seizing every opportunity to take advantage of the most modern technologies and economies of scale, as well as optimal plant location to minimize transportation costs of raw materials and of shipping the final product. Between 1957 and 1976, Japanese steel companies invested approximately the same amount in steel facilities as their U.S. counterparts; however, production capacity in Japan increased by 979 percent compared with 34 percent in the United States. Moreover, the Japanese companies had built 100 million tons of the most efficient, greenfield steel producing capacity, while the U.S. steel makers had installed only 11 million tons of greenfield capacity. (See Hans Muller and Kiyoshi Kawahito, *Steel Industry Economics,* 1978.)

Technological obsolescence

The technological obsolescence of the U.S. steel industry became a national scandal in the late 1970s. Especially under recessionary market conditions, the U.S. steelmakers were in no position to compete with the technologically advanced, lower-cost Japanese producers. The U.S. industry's recent modernization drive has consisted solely in shutting down vintage-1900 facilities and in more piecemeal installation of modern equipment—large blast furnaces, new coke ovens, continuous casting—which the Japanese steel industry has had for more than 20 years.

Thus, Japan's ability in 1976 to produce a ton of steel 30 percent more cheaply than the United States was boosted to a 40 to 45 percent cost advantage by 1981. In 1980, Japan produced 136.4 tons of steel for every 1,000 manhours, while the United States produced 96.7 tons in the same labor time. Japan's yield had risen from 38.6 tons per 1,000 manhours in 1964, when the United States was producing 81.2 tons.

The U.S. steel industry is far behind Japan and other countries on all the key measures of technological advancement.

Greenfield capacity. These plants offer all the advantages of economies of scale, full integration and computerization, state-of-the-art technologies, and optimal siting—direct access to deepwater harbors, which greatly reduces the cost of iron ore, for example. On average, new greenfield plants produce a ton of steel in half the manhours of old

A world without steel

A soon-to-be-released study by the U.S. Commerce Department on steel in the 1980s maintains that as GNP grows higher over this decade, the American economy will become less and less steel-intensive. Hence, the study concludes that steel demand is not one of the possible constraints on economic growth in the 1980s and, implicitly, the shutdowns throughout the industry are a necessary adjustment to a "less steel-intensive," "post-industrial" future.

The conclusions of the Commerce Department's steel experts follow from two methodological errors. First, they confuse real economic growth with gross national product (which includes inflated real-estate values, interest charges, and all types of fluff). Second, they project forward the post-1975 shift in the U.S. economy away from high-technology, tangible-goods production (machine tools, nuclear plants, infrastructure, housing) toward a post-industrial "information society" (personal computers, solar reflectors, downtown "rehabilitation" projects like Baltimore's boutique-lined inner harbor).

Said one Commerce Department economist who worked on the study, higher GNP growth in the 1980s will be composed of smaller autos that use less steel and electronic controls for machine tools, but not more machine tools. "One could argue that the United States will need to replace its railroads, bridges, and other infrastructure," he said, but that possibility was not figured into the department's projections on steel demand. Nor, according to the Commerce Department's projections, will the United States be producing more nuclear plants, houses, or tractors. Presumably, the future American population will eat Apple computers.

plants. Only two greenfield plants have been built in the United States over the last 25 to 30 years—U.S. Steel's Fairless Works in Alabama and Bethlehem's Burns Harbor, Indiana plant. U.S. Steel shelved its plans to build a 4-million-ton facility in Conneaut, Ohio after recession hit the steel industry in the mid-1970s.

Continuous casting. Continuous casters produce semi-finished steel shapes directly from hot liquid steel, eliminating the time, energy, and raw steel wasted in producing ingots and then reheating the metal and rolling it into desired shapes. Today, less than 20 percent of American steel is produced by continuous casting, the lowest proportion of all advanced industrial nations. In the summer of 1981, Japanese steel manufacturers were producing 70 percent of their steel by this method. As a result, the "yield" from raw to finished steel—a key measure of productivity—is low in the United States: 75 percent compared with higher than 85 percent in Japan.

Energy efficiency. Thanks to much wider use of continuous casting, newer and larger coking ovens and blast furnaces, and greenfield steel facilities designed to capture waste heat, Japanese companies presently use 30 percent less energy to produce a ton of steel than American companies.