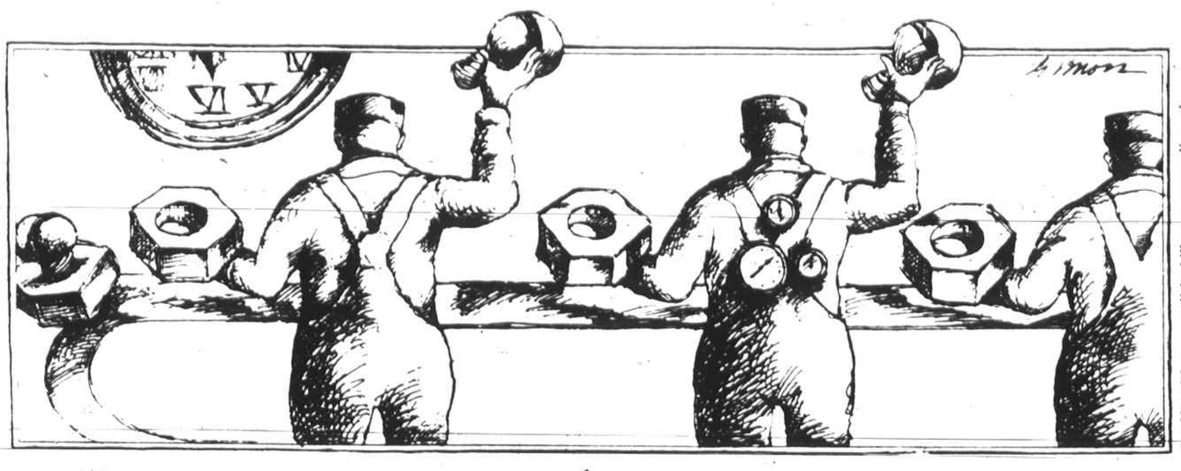
Occupational Destinies

CONNECTIONS
TECHNOLOGY AND CHANGE

by Joseph C. Gies



Geoffrey Moss — political illustrator syndicated

Technological innovations—new tools, new machines, new processes—affect not only human society but, directly and immediately, the producing workers. Today, it is possible to envision a society in which technology will liberate workers from much of the physical drudgery and boredom that have marked their lives in the past.

Better tools permit workers to produce more (and better) work; machines replacing tools save their labor and multiply their production; and computer-programmed automated factories turn them into monitoring engineers, employing mental more than physical skills.

Nevertheless, workers typically have not welcomed innovations in production technology—far from it. Nor are they entirely mistaken in their apprehensions about new techniques. Quite apart from their principal fear—that it may bring unemployment—new technology may have unforeseen effects on their working lives and personal destinies.

The outstanding historical example of the impact of changing technology on workers' lives is the development of factory mass production. Even while creating the abundance that has transformed the modern world, mass production has had a dehumanizing effect which governments, workers' organizations, enlightened management, and modern social science still seek to mitigate.

Fighting the Factories

The modern factory system has an ancestry going back many centuries. Medieval wool merchants in Flanders and Italy began "putting out" their wool successively to spinners, weavers, fullers, and dyers in what amounted to factories scattered through a town. The system foreshadowed the true factory both in increased volume of production and in the stimulation of class conflict. By no coincidence, history's first strike, in 1245, was by weavers of Douai, in Flanders.

The "Commercial Revolution" in which the Flemish wool entrepreneurs participated provided the basis for the later Industrial Revolution centered in 18th-century Britain. Spinning and weaving there were mechanized and steam-powered, multiplying productivity but alarming the hand weavers. In the early 19th century, bands of "Luddites," fearing loss of jobs, tried to destroy the new machinery but they were brutally suppressed by government troops.

In France, workers kicked machines to pieces with their heavy wooden shoes, or "sabots"—giving rise to the word "sabotage." Similar worker protests occurred in Germany and were memorialized by Nobel prize-winner Gerhardt Hauptmann in his drama "The Weavers."

British workers resisted another innovation: work discipline. At his celebrated pottery works at Etruria, England, Josiah Wedgwood, in the latter half of the 18th century, was one of the first to divide his labor force into sequential groups—potters, painters, firers, finishers—achieving both increased production and enhanced quality.

But the new arrangement required that workers conform to the pattern imposed by the flow of production. Previously, as craftsmen, each performing the whole range of functions in pottery making, the workers had frequently "kept St. Monday" (taken Monday off), and on other days had sometimes deserted their benches for an ale or a game of handball. Wedgwood posted rules and levied fines, but remained chronically vexed by labor troubles.

Loss of Dignity

As powered machines supplanted skill with semi-skill or lack of skill in industry after industry, workers in Britain and elsewhere lost their old sense of creativity and even their old dignity. An observer at a British trades-union congress in 1890 recorded the difference in appearance between the old aristocracy of craft unionists, with their respectable dress, often including top hats and watch chains, and the "new" unionists, the shabby, nondescript factory workers.

In America the industrial revolution at first produced a quite different effect. The wealth of natural resources and severe shortage of labor made the country highly receptive to the textile machinery spirited out of Britain (against ineffective laws forbidding its export) by Samuel Slater, a youthful immigrant of 1789 who became the "Father of American Manufacture." Native mechanics such as David Wilkinson and Paul Moody added Yankee improvements and helped found America's own machine-tool industry, that is, machines to make machines.

It was not surprising, therefore, that the next major production breakthrough, interchangeable parts manufacture, achieved its triumph in America. The concept had originated in France and Britain, where experiments had indicated its promise, but craft-minded European industry held back. In America, Eli Whitney, John Hall, and others developed it in the government-supported arms industry. It soon gravitated to production of iron stoves, sewing machines, and farm implements.

The American System

By the time Henry Ford appeared on the industrial scene about 1900, interchangeable-parts manufacture was known throughout the world as "the American system." From Chicago and Cincinnati meat packing plants, Ford got the inspiration for his assembly line, which brought parts directly to the workers in a continuous flow.

No rules needed posting, no fines were required. The moving line's inexorable pace enslaved the men feeding it, exacting repetitive functions performed with an inhuman consistency. Assembly-line workers were turned into the human machines satirized by Charlie Chaplin in his 1936 film "Modern Times."

Meanwhile, at the turn of the century, a Philadelphia engineer, Frederick W. Taylor, devised a way to increase steel workers' output by minutely analyzing their jobs. By following Taylor's instructions faithfully, a worker could substantially improve his piecework earnings. But "Taylorism," or scientific management, copied and often abused, won a reputation for efficiency at the expense of humanity.

A glimmer of insight into worker psychology came in the 1920s, quite by accident. In studying the effects of improved illumination on worker performance at the Western Electric Company plant at Hawthorne, Illinois, Elton Mayo was astonished to find that a control group, under the old lighting, improved its production as much as did an experimental group under better lighting. The "Hawthorne effect" showed that workers responded with better performance to the mere fact of being consulted, asked to cooperate, dealt with as human beings.

Further experiments explored the relationship between man and machine and the worker subculture, virtually creating a new sociology. Human-factors engineering, an outgrowth of Taylorism and the Hawthorne experiment, sought to design machinery and equipment for maximum ease, convenience, and suitability.

Automation

The most recent stage in mass production, automation, came immediately following World War II (though machines basic to factory automation go back to the Waltham Company in the 1880s). Workers' resistance in some industries, such as railroading and printing, has brought considerable conflict. Yet overall, automation's impact on employment so far has proved limited.

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ABOUT THE AUTHOR

JOSEPH C. GIES has been Director of Publications for the Association of Governing Boards of Universities and Colleges since 1974. He was previously an editor for *This Week Magazine* and senior editor for technology for *Britannica III* of the Encyclopaedia Britannica. A prolific writer, he has published many stories, articles, and reviews in magazines and journals in addition to his books in the history of technology, which include *By the Sweat of Thy Brow: Work in the Western World* (with Melvin Kranzberg), *Bridges and Men*, and *Wonders of the Modern World*.

Chronicle Letters

Who Would Arena Benefit?

Dear Editor:

Before the taxpayers of Winston-Salem vote in the November special election, I hope they will ask themselves the very pertinent questions "Who really profits?" and "Who really pays?" if a new coliseum is built downtown.

The argument being advanced by coliseum proponents that a new taxpayer-financed coliseum is necessary to compete in North Carolina's convention business is shortsighted, hogwash.

The best thing that could happen to North Carolina's convention business is ratification of the Equal Rights Amendment. If North Carolina becomes the first southeastern state to ratify the proposed 27th amendment, then over 350 national organizations such as the National Bar Association, Common Cause, American Federarion of Teachers and American Civil Liberties Union, representing millions of people, would be free to hold their conventions and spend millions of taxable convention dollars in Winston-Salem rather than Pennsylvania, Kentucky, or Maryland.

Anyone who doubts that ERA ratification or the convention boycott means big bucks is invited to inquire of the Miami, Las Vegas or Chicago Chambers of Commerce or Convention Bureaus as to those cities' financial losses in recent years from cancelled or unscheduled conventions of those national organizations which, like most of us, believe that "equality of rights under the law shall not be denied or abridged by the United States or any State on account of sex."

As far as the contention by coliseum study economist Dr. Alfred Gobar that "much of the new business would benefit the lower income segment of the community," what could possibly more benefit the lower income segment , primarily blacks and women, than legally guaranteed equal opportunities, salaries and benefits?

Carolyn Hackney
Pfafftown

News Deadline

Beginning October 12, 1979, the deadline for all news articles and pictures will be 12 noon each Tuesday. If the articles are handwritten they must be received no later than 12 noon on Monday.

Articles and pictures can not be returned by mail. They must be picked up at the Chronicle office located at 516 N. Trade St.
NO EXCEPTIONS!