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July 1983JOBS IN THE FUTURE: HIGH-TECH AND LOW WAGES
by Lori Gladstein

For an economy struggling to emerge from its most severe post-war recession, high-technology is cast as the solution to the nation's economic problems. There is no doubt that the American economy is undergoing widespread change: traditional, heavy industry is declining (manufacturing's share of output and employment is falling), and other industries, different from the traditional smokestack industries in their reliance on high-tech, are expanding. This structural change, coincident with the poor performance of the depressed economy, has encouraged recent advocacy of industrial policy, with an emphasis on high-technology industry. But, in fact, high tech will not be an instant solution to the current problems of high unemployment and inadequate investment. Before the U.S. rushes to high-tech as a panacea, it is important to consider what high-tech will mean for the economy. This article will look at some of the implications of high-tech on employment and wages.

The Bureau of Labor Statistics (BLS) defines a high-technology industry as one where research and development expenditures and the number of technical employees are twice as high as the average for all U.S. manufacturing. Under this definition, drugs, computer and computer programming, electronic components, aircraft, and chemicals are some of the high-tech industries. According to BLS, the number of high-tech jobs created over the next ten years will be less than half of the two million jobs lost in manufacturing in the last three years. Unlike traditional smokestack industry, high-tech industry will not be a major employer. In 1979, high-tech industry employed three million workers, which was 3% of non-agricultural employment. That percentage is expected to rise only to 4% by 1993.

Robots as Labor in High-Tech -- By expanding the nation's production possibilities, technology holds the promise of improving the quality of working conditions. Potentially, technological progress can eliminate the drudgery and danger of demeaning, physically demanding work. Whether jobs become more or less fulfilling depends on the application of technology. This article looks at the direction in which high-tech is likely to develop, but other applications are possible.

High-tech applications are labor-intensive only at the highly educated, professionally trained level. Innovation and sophistication in computer design is done by engineers and technicians. When new designs are first put into production, they require highly skilled workers. But as production processes mature, lesser skilled (and lower paid) workers can be substituted for skilled workers. Historically, production has been characterized by a division of work into its component tasks. Dividing work into simplified operations means that cheaper labor can be hired, since tasks require few skills. Experts forecast that as high-tech industries continue to grow, productivity will rise rapidly. Data Resources International, an economic consulting firm, estimates that productivity in high-tech, measured by output per worker, will increase 46% between 1983 and 1993, while manufacturing productivity is expected to increase only 24% and service productivity 23% (measured in 1972 dollars).

Within high-tech industry, labor faces two problems. Many high-tech companies are using their own products to replace labor in the production process. Not only will the division of the work process reduce the skills needed in each task, but robotics may either replace labor or further downgrade skill requirements. In addition, unskilled labor will face competition from lower-cost foreign labor. Moves similar to Atari's relocation of 1700 jobs from Silicon Valley to the Far East can be expected to continue.

Most Jobs Will Not be High-Tech -- High-tech will never be a major employer like the steel and automobile industries. Most jobs created during the 1980s will be in traditional occupations. High-tech jobs (computer systems analysts, programmers, engineers, technicians) will have large percentage growth because that percentage is computed on a small employment base. Other occupations (clerical workers, sales, janitors, food service workers) will contribute far more jobs than high-tech, but will be slower growing in percentage terms because of their relatively large employment base.

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Here is a list of the fastest growing occupations, and in contrast, the occupations that will produce the largest number of jobs:

	Thousands of new jobs	Percent growth 1980-1990
A. Occupations with largest percentage growth		
Paralegal personnel	37	118
Data processing machine mechanics	84	101
Title searchers	5	77
Computer operators	138	75
Computer systems analysts	146	71
Office machine and cash register servicers	36	65
Dietetic technicians	4	62
Computer programmers	118	52
Food service workers, fast food restaurants	404	50
B. Occupations with largest absolute growth		
Managers, all other ¹	1,028	15
Secretaries	759	31
Sales workers, all other ¹	636	21
Janitors and sextons	562	20
Nurse's aides and orderlies	550	47
Sales clerks	480	17
Cashiers	476	30
Food service workers	404	50
Waiters and waitresses	374	22

¹all other -- not classified as a specialized occupation

The educational requirements of jobs will differ greatly from the educational attainment of the labor force. Most jobs will require little formal training beyond high school, while more workers will have completed four years of college. In 1952, eight percent of the labor force had completed four years of college. In 1980, that percentage had increased to 19%. Industry is not providing jobs of equal skill and educational level. Since 1952, the proportion of college graduates in clerical, lower level sales and blue-collar occupations has grown, while the proportion of college graduates in professional, technical and managerial occupations has declined.

Today, over two-thirds of U.S. workers are employed in service-producing industries (transportation, finance, insurance, real estate, wholesale and retail trade, services) and this proportion is expected to increase in the 1980s. Jobs in these industries traditionally have been ones of low pay and little unionization. As employment grows, these characteristics may change. AFSCME is organizing employees, many of them clerical, in the public sector, and the UAW and SEIU are trying to organize private sector office workers.

Facing the Prospect of Lower Wages -- While the diffusion of computer technology throughout industry will affect workers in a variety of situations, advanced technology does not necessarily imply sophisticated skill. If the division of the work process into component tasks continues with computer technology, it can be expected that for many jobs, skill requirements will be less demanding. Low paying, low skilled jobs are not going to disappear.

Workers displaced from unionized, highly paid jobs in traditional industries face dim prospects. For them, re-employment in expanding industries probably will mean reduced wages. In 1980, average weekly earnings in manufacturing were 23% above the average for total private nonagricultural employment. Services and wholesale/retail trade were 19% and 25% below average, respectively. Average weekly earnings in primary metal industries were 66% above the private nonagricultural average, and in motor vehicles, 68% above average. Average earnings in primary metals and motor vehicles were over twice the average earnings in services.

High-tech may indeed transform the workplace. However, for the unionized traditional manufacturing workers of today, the transition to tomorrow's nonunion electronic workplace will mean a lower standard of living.

--Lori Gladstein