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# Machine Tools -- Their Effect on Unemployment

Tentative Statement of the Fact-Finding Committee of the American Society of Tool Engineers

By PROFESSOR JOHN YOUNGER, Chairman

THESE are many ways to attack this problem. We could, for example, show how the machine has contributed to our civilization. How the automobile is made possible—the radio—the moving picture industry—the washing machine—the food industry—the present-day, low-price clothing industry—the farm appliances. But these things are obvious. Without the machines we would be back in the dark ages, living in a land such as China is, where everything has to be obtained from nature by hard manual work. It is inconceivable that we should give up the machine and revert back to our old days. We value too much our luxuries which today have become our necessities. Today the machine tool has justified itself by creating products at much lower prices than ever before and so putting these products within the reach of all. For example, it is a very humble home that has not its radio and even its automobile. In the cities and in many, many parts of our rural communities, electric current produced by machines provides light and power for innumerable conveniences. No longer do we toast our daily bread slowly and laboriously before an open fire. The electric toaster is almost universal in use and a mere snapping of a switch puts it in operation.

No, we could not go back to those old days, but perhaps the question is asked, "Do we pay too high a price for these comforts? Do we pay a price of men's lives for these things? Do we put men out of employment by their use?" It is the question we will endeavor to answer.

It is not too far to go back some 150 years to the date in 1774 when the steam engine was being developed—the steam engine which has revolutionized our world of civilization. It is an almost impossible task to build a steam engine and get the cylinder true. The piston had to reciprocate in the cylinder, and hence, accurate circular shapes had to be made. The lathe answered the question of the piston and the lathe was modified and improved to do this work, but it was not till the invention of that machine tool known as the boring mill that we had a truly circular shape for the cylinder. It is from these two machine tools that our civilization of today has sprung. In those days we had very few men, indeed, in the mechanic arts. Today, we have millions.

The machine tool has created these jobs. Or, let's take the early days of the screw-thread industry. Some 120 years ago our forefathers would cut what few screw threads they did cut by sheer manual labor. They would chip by chisel and hammer and then finish by file until a screw thread resulted. Screw threads were

a rarity and very expensive and very few men were engaged in this task. With the invention by Whitworth and Maudslay of the screw-cutting lathe, the machine tool entered the picture and made screw threads more accurate and, particularly, cheaper. Further inventions of machine tools have made the screw thread of today commonplace, and we can buy the screw in a 5 and 10-cent store. Where a dozen or so men were employed 120 years ago, we now have an army of thousands of men directly and indirectly concerned with the screw thread. Machine tools have created these jobs. We could go on from instance to instance, but one more will suffice.

The motion-picture industry in its perfection is made possible only by the machine tool. It is the machine tool which makes our camera and our projector possible. Without them literally nothing could be done. And so we can say that the thousands of people who owe their enjoyment to the motion-picture industry, in turn, owe it to the machine which created it.

The automobile, made possible through the machine tool, has given employment to nearly ten millions, the iceless refrigerator industry to a few millions, and so on. The small vendor of hot hamburgers along the highway owes his livelihood indirectly to the machine tool.

By lower costs, which in turn create lower sales prices, we are able to tap into bigger markets and so get increased sales and, hence, increase employment. In 1930, at our last census, some 14,100,000 persons owed their jobs to manufacturing and mechanical industries, or some 28 per cent of our employable population. All of these owed their jobs directly to the machine, not to speak of those who owed their jobs indirectly, by virtue, let us say, of selling washing machines, or what not.

There is no question, then, but that machines definitely create employment. The statement may next be made, "Well, that is true of the early beginnings of the machine tool, but recently you have been going ahead too fast. Invention has been outstripping employment and today your machine tools are displacing men from jobs."

Consider 1929, a boom year. There were relatively few people unemployed and there was no question but that the machine tool was largely responsible for the vast amount of work being done. So that we can point to 1929 as certainly a year in which we could say that up to that time machine tools created employment.

Then came the depression. We know now that this depression was not caused by the machine. We know that in its initial stages the machine had nothing to

do with it, but the question arises, has the machine tool, with its great work possibilities, prolonged the depression?

Let us start, then, with 1930, and we quote from "Machinery, Employment and Purchasing Power" of the National Industrial Conference Board:

"It is significant, in view of the claim that extensive unemployment has been caused by the introduction of the labor-saving machinery, that in the census of 1930 the number of workers who attributed their unemployment to this cause is so small. In a total of 3,633,896 returns reporting unemployment in this census, only 10,651 persons, or less than one-third of one per cent, gave 'Machinery introduced' as the reason for their unemployment. It is safe to assume that the installation of the type of machinery does not take place without the knowledge of the worker whose means of gaining a livelihood is threatened by it." Futher, "But considering the general attitude of workers toward the introduction of labor-saving machinery, the number who attributed their unemployment to this cause is likely to represent too large rather than too small a proportion of the unemployed."

But, after 1930, have we gone too fast, have we introduced too many machines? Well, here are the facts: the machine tool industry was not spared from the effects of the depression. In fact, it suffered as badly as did other industries. Many a shop in Cincinnati, Rockford, and New England territories was virtually, if not absolutely, shut down and there was very little, if any, production of machine tools. Hence, the blame for the continuance of the depression cannot be laid at the door of the machine-tool industry. You cannot make bricks without straw. You cannot displace men by machines which never were built.

#### MACHINES STILL CREATE EMPLOYMENT

Then comes the question, "Well, we believe that machine tools create employment in the long run, but what of those individuals who are displaced temporarily, due to the introduction of machine tools? What is going to happen to them?" Yes, that is an awkward part, but we must face it. Here are the facts. We quote from a well-known manufacturer of power presses.

"I know from specific experiences in our own plant that new, modern machines are more efficient. With one such machine we can frequently do as much work as we formerly did with two or even three more obsolete machines of the same class.

"It would therefore seem that the new machines we buy displace labor. However, as a matter of fact, with all of the new, more efficient equipment we have installed, our payroll is just as large as before. We are, however, running a more efficient plant as a result of our investment in new machines. We are handling a greater volume of business and turning out a better product and at a lower cost. All of these advantages pass on to our customers and ultimately on to the final

customer. By buying these new machines we have been the cause of giving additional employment for the labor required in their production.

"If we did not reinvest the material portion of our net earnings in new, modern, efficient machines (although the present federal tax system makes it very burdensome to do so), we eventually could not compete with our old obsolete facilities, hence, our employment would gradually shrink and we might even reach the point of passing out of the picture, giving no employment at all.

"Therefore, from actual experience and not merely a theoretical point of view, I cannot be convinced that machines do ultimately displace any labor."

Automatic polishing machines were installed in a large manufacturing plant. Seemingly, they would displace labor. Actually, they so reduced costs on this operation that our sales prices were reduced, calling for more business which resulted in increased employment. Many similar instances could be cited, but there still remain places where the introduction of labor-saving machinery has definitely thrown men out of work.

As we stated, in 1930 it was only one-third of one per cent, but even that is a significant figure.

President William F. Green of the American Federation of Labor states, January 4, 1939: "Labor has always believed that the increased production due to technical progress and new industries created by the interplay of such changes can result in greatly increased work opportunities. The Federation does not oppose the introduction of new machine tools nor new processes, but it holds that before changes are made, plans should be made for workers who will be displaced and forced to find new jobs." He further states, "Consideration has not been given to the displaced workers. Here is an important function for the employment office in cooperation with vocational retraining." Finally, "We know very little about whether the displaced workers ever find new employment and whether they are forced into new occupations at lower earning rates."

President Green may be right. Industry has neglected these men, perhaps because it was known that the situation would eventually right itself by the machine tools eventually creating employment, but the situation is serious for the individual displaced. Very much more study must obviously be given to this phase of which we know so little, but these are a few facts.

There are many miners displaced by the effects of the mechanization of the coal mines. Lowered costs of mining were the result of the mechanization but this was not passed on to the consumer, because simultaneously wages were being increased. The net result was that the price of coal increased somewhat, and the demand for coal decreased. Today the conveniences of oil and gas are demonstrating themselves with the result that the demand for coal is receding and that miners

are laid off. The result cannot be attributed entirely to mechanization, for this process would have undoubtedly led to lower prices and hence greater sales and more employment.

These miners have been forced to get other jobs and many of them have left their homes and found employment in the rubber industries and in the automotive industries. Today's machines are on the whole so simple to operate that a man can learn a new trade in a few hours and these men did so. In many cases their earning power was increased.

Let us again look at the facts (and we should not get them from these abnormal years that we are passing through now, but rather from periods where normal prosperity rules) and again question, "Machinery, Employment, and Purchasing Power." "The amount of long-term unemployment in periods of relative prosperity is very small. People are out of work a few weeks, or in extreme cases a few months. We already showed that as recently as in 1936, when there was a distinct shortage of men in many trades.

The answer comes back to President Green's statement. We must go ahead with the new machines but we must plan for and make provision for the displaced workers.

The president of one of our big steel mills points out that in 1922 the cost of steel at his mill was \$145 per ton, but in 1937 this had fallen to \$64 per ton. Meanwhile wages and salaries had risen from an average of \$1600 per year per worker to an average of \$2000 per year per worker. The final result was that there was a great increase in sales and much more employment.

The coming of more trade schools, the coming of more manual training courses in our high schools will do much to make our new population more flexible in their training and education, so that they can be fitted for different kinds of jobs.

There is a further thought on this subject and that is whether our factories can be made to tie into our agricultural work to a greater extent. Mr. Henry Ford is doing this in several of his plants, where men work a reasonable day at the plant and then spend their so-called leisure time in small farming. By an extension of this principle, a man laid off could at least earn a livelihood on his farm land. This is not offered as a necessarily practical solution, but only as a thought to which attention should be drawn.

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