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## MIND, MUSCLE, AND MACHINERY.

Speaking of the influence of machinery upon the artisan, an intelligent professional man said to us the other day: "It stands to reason that a man who operates a machine for polishing boot heels, for instance, must by the very nature of his occupation be less intelligent than the man who sits at the bench and makes a whole shoe."

Our friend merely expressed in a pointed way what many feel, namely, that the more nearly automatic machinery is, the greater its effect in subordinating the man to the machine; the more it tends to depress the value of mind and manual skill, and so lower the intellectual grade of the operator.

Where so many elements enter the problem—elements whose value and bearing it is difficult if not impossible to estimate—it is no easy matter to pick out one, and say positively how much of a man's industrial condition and mental character is due to it. Indeed, it is quite useless to attempt the solution of such a problem as this by the study of individual cases. Only by considering the relative conditions of masses of men is it possible to arrive at any just conclusion as to the influence of a factor like machinery upon the intellectual condition of those who use it.

Machinery can affect the artisan class in two ways—by its selective action, and by its direct influence upon those who use it. In other words, machinery may alter the average intellectual grade of the men required to do a given work by demanding on the one hand a higher average grade, or on the other by allowing the work to be done by less capable men; and it may less directly affect the membership of a trade either by dulling the intelligence of the operative, or by schooling him to greater alertness and thoughtfulness.

There is one phase of this question which may be touched in passing, and that is the vastly increased demand for the highest grades of skilled labor in making the machinery used in our shops, and in making the machines used in making that machinery. Trustworthy statistics are not to be had in this connection; yet we are confident that the facts will bear us out in the assertion that the skilled machinists and tool makers now employed in the occupations we have mentioned, outnumber many times the skilled men displaced by labor saving machinery.

While the introduction of machinery has in no wise diminished the demand for the higher grades of skilled labor, but has rather increased it, we must admit that it has likewise opened the door for a large increase in the number of low grade men in mechanical employments. To meet this demand we have imported men largely from Europe, from the French provinces of Canada, and to a small extent from China. The wisdom or folly of these importations we do not propose to discuss here. In any case machinery is not to be blamed, so long as it has not diminished high grade employment for men of native birth.

We now come to the main point at issue: Does the using of machinery dull the intellect? Does the machine user lose his manliness in proportion to the perfection of the machine, allow his skill of hand and acuteness of sense to die away, and, becoming, as it were, a part of a machine, sink to the level of brute matter? We have heard this charge laid at the door of machinery time and again by people by no means unintelligent. It is one of the current fallacies of the labor question.

We doubt if there was ever a keener or more intelligent body of critics ever set to judge the results, and indirectly the processes, of a nation's industries than the foreign judges of the Centennial Exhibition. They were not prejudiced in our favor, and they had no axes to grind. We may safely quote their testimony, therefore, as to the influence of machinery upon the character of our working classes. One of them, a manufacturer of the first rank, well acquainted with this country and our industries, writes as follows:

"Machinery hall is the mirror of the processes and of fabrication both of the United States and of the Old World. But this mirror presents to the European a painful image. He learns too late the truth of the maxim that time is money, and consequently the importance of machinery in production. Scarcely has the European who goes to America to earn his bread put his foot in the country when already his star cries to him, 'Time is money,' for he sees immediately with what facility the American works, and how much in this respect he himself remains behind. The American produces twice or thrice as much as he, and with less trouble. The reason is that the European works as he has learned to do, that the master continually teaches his apprentice the same routine, while the American seeks unceasingly to simplify the manipulation, to invent, and to apply every possible improvement. The first thing which must be done by the European who comes to work in America is to break off the old routine, and to seek, while practicing himself in the American system of work, to acquire that which neither the good schools of Europe nor his former experience have taught him," and that, in brief, is to be quick, wide awake, and exact in his work. Further on the same observer says:

"My workmen also work with American machines. They have the same tools, but their productive capacity is far inferior to that of the American operative. The same observation has been made to me by superintendents who have established German shoe factories after the American system, and who often cannot succeed with German workmen." We may note here that American manufacturers have no trouble with German shoemakers—after they have been sufficiently educated by the use of machinery.

Again we read: "I am satisfied from my knowledge that

no people has made, in so short a time, so many useful inventions as the Americans; and if to-day machinery apparently does all the work, it by no means reduces the workman to a machine. He uses it as a machine, it is true, but he is always thinking about some improvement to introduce into it, and often his thoughts lead to fine inventions or useful improvements." The chief reason for the tendency of the American workman's mind to run in the direction of invention is very properly found in the inducements held out by a liberal patent law.

A manufacturer of even wider experience, in France as well as in Switzerland, observes that "the use of new and admirable automatic machinery has revolutionized every kind of manufacture, by dispensing more and more with hand labor; but we must not forget that to manage these machines, to adjust them, to get out of them all that can be got, requires workmen better and better taught, careful, experienced, and steady." Subsequently, after referring to the Swiss commissioner's report with regard to the superior intelligence and productive power of American machine users, the writer goes on to say:

"We have constantly made the same observation in our own machine shops. Whenever we compare the work of two mechanics of unequal skill, both using automatic mechanism or performing the same work by hand, we always find the relative excess of production of the more skillful workman over that of the other much greater in the first case than in the second. Manual labor when it is irksome and monotonous dulls the mind. But when a workman who possesses the spirit of order, some training, and the elementary principles of geometry and mechanics, has charge of an automatic machine his mind cannot be at rest. When his machine is in operation, he profits by his leisure to examine the work which it has performed. He detects and remedies the causes which make it irregular; he keeps the detached parts of the machine in order, and the whole well regulated. Thus he avoids waste and interruptions." And in doing all this he necessarily raises himself in the scale of intelligence.

One line of testimony of this sort is worth any amount of guesswork from those who lack practical experience with men and machinery, no matter how learned they may be in other directions. No machine can put brains into a mechanic's skull. The most perfect piece of automatic mechanism cannot educate a natural born fool. But if a man has any brains, if he has any desire to improve himself, the management of a machine, even for polishing boot heels, will leave his mind as open to thought, as free to improve itself, as the best equipped cobbler's bench in the world. One great obstacle to the introduction of improved machinery has always been the circumstance that the average workman has seldom been intelligent enough to use such machinery at once to advantage. How much has the sewing machine done to give an idea of mechanics to our women! To be a successful farmer now, one has almost to take a course in practical mechanics, in order to be able to handle his machinery properly. So it is more or less largely in every department of labor. Machinery has compelled the better education not only of mechanics, but of everybody.

## A NEGLECTED INDUSTRY.

A new field awaiting the employment of an immense amount of labor, capital, and inventive talent now exists ready at hand in the neglected flax and linen industry of America. Forty years ago nearly every farmer in the country knew how to raise and prepare flax for domestic use, and many of our fathers and mothers were to some extent engaged in this manufacture. In 1845-55 several manufactories were put into existence in New England to make the various kinds of fine linen goods. Among these were the Stevens mills at Webster, Mass., the Willimantic, in Connecticut, and the American Linen Company, of Fall River, Mass. The latter was established in 1852 with a capital of \$500,000, and had at one time 250 looms running upon sheeting, table linen, and coating and pantalooning, besides the coarser kinds of fabrics.

These mills were enabled to start by the placing of a duty of 25 per cent upon linen goods in 1842, while they had previously been admitted free of duty. But in 1857 the duty was removed and linen again admitted free of duty, and the infant industry was strangled. Nothing of the old industry now remains excepting the Stevens mills, making crash and huckaback, at Webster, Mass. These mills are no longer in the possession of those who originally established them. The Willimantic no longer exists, and the American Linen Company changed to cotton manufacture long ago.

Besides the Stevens, which is much the most extensive mill in the country, making some fifteen kinds of coarse goods, there are the Stark, at Manchester, N. H., the Ludlow and the Bay State, in Massachusetts, all small producers of coarse linen fabrics. These, we believe, are the only mills weaving flax fabrics in the United States. Tow bagging is made in several places in Ohio, Indiana, Louisville, and in Illinois, while the initial steps toward the establishment of a linen mill have been taken in Oregon.

Extensive flax thread mills exist, one at Paterson, N. J., employing 500 hands; one at Troy, N. Y.; and one in New York city, employing 600 hands. Up to 1872 there were nearly a hundred flax bagging mills in the central Western States, but the reduction of duty upon jute caused an almost complete transfer to jute bagging, the material with which the South now covers her cotton.

This is the condition of the linen industry in the United States at this time. Of the raw flax used by the crash and