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EFFECT OF LABOR-SAVING MACHINERY UPON WAGES.

In a former article, we discussed the effect upon the relation existing between capital and labor, produced by the increasing use of labor saving machinery. Our present purpose is to show that the substitution of machinery for manual labor has greatly increased the rewards, or wages of labor. In our former article we endeavored to show, that in their effect upon the aggregate amount of labor required to supply the general demand, improvements calculated to decrease the particular amount of labor necessary to produce a single article of necessity or luxury, were rather, on account of the demand for greater quantities of such articles caused by the reduced cost of their production, to be called *labor creating* machines, than the reverse.

The history of all improvements shows that the introduction of machinery calculated to facilitate and cheapen production, has increased the demand for labor. This increased demand could, notwithstanding the increase of population, never have been met, if some of the improvements referred to had not been so great as to almost entirely remove the necessity for manual labor in certain occupations, and thus transfer the laborers from those fields to others where their services were needed. Another way in which the increased demand for labor has been met, has been by the creation of entire new classes of laborers. The employment of children and females to operate the machines which have created certain branches of labor, has been the only way in which such machinery could have been profitably introduced and worked. Should these and other classes of laborers, that labor-saving machinery has created, be withdrawn from the general stock, the effect upon the industrial interests of the world would be crushing.

The increased demand for labor has raised its price in the market. The law of supply and demand applies to this as to everything else; but if the effect of mechanical improvement is to increase demand, wages must increase also with every advance in the arts. We believe that in the future the march of improvement will be no less rapid than in the past, and consequently, from this cause alone we argue continued increase of wages.

But there is another law of increase that is just as potent as the law of demand and supply, and which should not be overlooked in forming correct opinions upon this subject. Wages, or rewards for labor, should not be estimated by current value in dollars and cents. Operatives never fail to see this point clearly when prices of provisions, clothing, and rents rule high, that is, they never fail to perceive it in its particular application to their own circumstances. When one dollar buys only two pounds of butter where it formerly purchased four, and when other articles have advanced in proportion, they at once realize that two dollars per day is no better than one was when prices were only half as high. But they fail, generally, to see the more general advance of wages estimated by the amount of the comforts of life that can be obtained for a given sum, that has been going on steadily in accordance with the constantly decreasing cost of manufacture. We have shown that with each new invention which enables a given amount of labor to increase its rate of production, a corresponding decrease of price takes place. This decrease of price has been so great within the last fifty years, that ordinary mechanics are now enabled to live in a style that formerly was possible only to the moderately wealthy. Fifty years since, a mechanic wore the coarsest fabric, and ate the plainest food, because he was obliged to do so. His house was destitute of carpets; its furniture was such as he now would be ashamed to exhibit to his friends.

A piano would have been beyond the most extravagant hopes of his ambitious daughters. Books were few and costly; newspapers were so rare that when one was obtained the whole neighborhood congregated to hear it read. Facilities for travel were few and expensive. Family portraits entirely out of the question. The most limited education was all that he could hope to give his children; and the long hours of his daily toil were uncheered by the ameliorations which are now considered essential in every well-ordered workshop. All these things are now within the reach of the mass of mechanics, and it is not too much to say, that if the things which were formerly considered luxuries, but which are now from long habit considered necessary, were avoided, and mechanics should limit their expenditures to the supply of such articles as would have contented a mechanic's family half a century ago, their savings would be more than treble what artizans could have made at that period.

In view of these facts, we believe Trades Unions, as permanent organizations, are, to say the least, unnecessary, and we believe them to be hurtful to the best interests of operatives in all branches of manufacture. We believe it must soon appear that the tendencies of such organizations are injurious to the best interests of the working classes.

MODERN TELEGRAPHY.

"Modern Telegraphy" is the title of a considerable pamphlet recently prepared by Prof. Morse for the purpose of correcting some errors respecting the origin of the recording telegraph.

It appears that Great Britain has recently conferred knighthood upon Charles Wheatstone for establishing the telegraph "not only in the United Kingdom but also throughout the whole civilized world." To say the least, this appropriation of the invention of the telegraph to the credit of Prof. Wheatstone, is a cool proceeding. It might, however, pass unnoticed but for the fact that the United States have a counter claim to set up in behalf of one of their own distinguished citizen, Professor Morse, who shows in the pamphlet now before us, that the means and process of imprinting or recording signs automatically by an electro-magnetic arrangement, were devised by him, and that this was the first realization of a telegraph in the strictest sense of the word. The American system of communicating at a distance is a TELEGRAPH, and we believe it was the first telegraph. The English system, on the contrary, is simply a SEMAPHORE or sign telegraph, which does not propose or pretend to imprint or record.

The two inventions are not identical. But even admitting that they are, which no scientific man will contend, Morse claims priority of discovery. The American telegraph was invented in 1833, and exhibited in 1835. The English semaphore was devised by Cooke not earlier than 1836, therefore Morse has the precedence.

In opposition to the assertion that Wheatstone has established the telegraph throughout the civilized world, the facts are a complete refutation of this claim. The American telegraph system is established throughout the Western Continent, not merely in the United States, in Mexico, South America, and the West India Islands, but in Canada and the British American possessions; it is the system adopted in the British Colonies of Australia and of India: it is the system adopted by the International Telegraph Convention of 1865, in Paris, in which all the principal nations of Europe were represented (except England); and thus the "whole civilized world" (with the above exception) appear to have unanimously adopted the American telegraph, and have acknowledged their obligations to the American inventor by designating it the "Morse System." The English semaphore is not used out of the United Kingdom, and if we mistake not, even there it is gradually being superseded by the Morse system, which is extensively used, but generally without acknowledgment.

Prof. Morse has maintained his claims legally against all comers, and it will not do now to undertake to rob him of those rights by conferring honors upon others.

ABUSE OF THE FRANKING PRIVILEGE.

Our attention has been frequently called to the subject, and our observation confirms the fact, that Members of Congress are in the habit of franking letters and circulars for their friends to a large extent, and thus rob the Post Office Department of a considerable portion of its revenue. Claim and Patent Agents seem to be among those most favored by our Honorable Congressmen. Formerly it was required of those entitled to the franking privilege that they should *write* their names on the envelope, but latterly the custom of using an engraved *fac simile* of the signature has become general, and thus the M. C. is relieved of the onerous task of doing his own franking.

A boy can, with the convenient modern hand-press, print many thousand signatures in a very short time, and probably the office boys of some of those Claim and Patent Agents who flood the country with their printed circulars are permitted to do this printing for their employers. We do not know that this is so, but if some of the M. C.'s do the presswork on all the envelopes that are mailed with their *franks*, they are more industrious than the public generally accredit them.

We are led to call public attention to this abuse of the franking privilege, not at all because it is a new feature, but at the suggestion of an indignant correspondent, who sends us a twenty page advertising pamphlet of a Washington Patent Agent, mailed to him under the frank of Hon. John A. Logan, M. C.

We find, by referring to the postage account of the SCIENTIFIC AMERICAN Office for the year ending in May, that we

have used over \$6,000 worth of postage stamps. Supposing it were generally known that a dozen or two of like stamp-consuming firms should obtain permission to use the franking stamp of some Honorable M. C., would not the public be justly indignant, and feel that the postal department was being defrauded?

Of the extent to which the franking privilege is used and the extent to which it is abused, we believe the public have but slight conception. Were it not that it is the legislators themselves who keep the law in force, we should hope to see it speedily repealed. But as it is, there is no hope of that, and but little probability that any notice will be taken of the fact that the custom of franking for business firms is becoming more and more general.

QUALITY OF MUSICAL SOUNDS.

A difference of opinion seems to exist among savants, as to the cause of peculiar qualities of different musical sounds, exclusive of pitch and volume. Prof. Tyndall attributes the difference of quality to the harmonic sounds which attend all musical tones, and says that in the organ the overtones (the name given by him to the tones hitherto known to musicians as harmonics) are felt to be so necessary to a good musical clang, that they are introduced by small pipes. He also asserts that the vowel sounds are due to accompanying harmonics.

On this side of the world, other views are advocated. In the *American Journal of Science and Arts* for May, an excellent article upon the Musical Ratios, by Prof. H. W. Poole, contains an allusion to a proposition laid down by Prof. Tyndall, and strong objections are urged against it.

Mr. Poole argues that the pleasant quality of a sound depends greatly upon its purity, both as regards pitch and its freedom from the harmonics, which Professor Tyndall considers so desirable. He remarks that it was considered "a triumph when the pianoforte was made to give less of the jangling harmonics, and more of the pure fundamental tone of the string."

Without assuming to be arbiter of the opinions entertained by men so distinguished in this department of science, we incline to the views of Prof. Poole. We believe the quality of different musical sounds consists partly in the manner in which vibrations, independent of rapidity or amplitude, are transmitted to the sensorium, by the delicate and as yet unexplained mechanism of the internal ear. We base this opinion upon the fact that the internal ear does at times produce within itself certain sounds not dependent upon external causes. Every one has experienced bell-like, ringing sounds, or buzzing and sibilant noises, that are the result of deranged action of the auditory apparatus. These sounds sometimes last for days, after the ear has been stunned by an explosion; and sometimes they may be heard, for a few moments, when no external cause can be assigned, ceasing often for a short time to recommence in another form. Our theory is, that when any musical sound is produced, the ear in its transmission qualifies it according to the nature of the minute wavelets of air which are produced by the texture of the vibrating body. Thus a violin string, when so much worn that many fibers exist upon its surface, gives a peculiar harsh and muffled tone, as though the bridge were weighted with something that interfered with its vibration, only in a less degree. The harshness of the sound of filing, also, is probably caused by the clashing of minute waves of air, emanating from the teeth of the file. We have often noticed in the filing of a bar of steel, that the harshness of the sound ceased with the removal of the file, the bar continuing to vibrate in a clear, musical tone for some time after. In the filing of saws we have also observed that the purity of the tone produced after the file was removed, was greater in large saws, having but few teeth in proportion to the extent of their surface, which seems to show that the waves produced by the teeth, like those produced by the fibers of the worn string, tend to give harshness to the tone produced.

When the bridge of a violin is damped, a very peculiar quality is imparted to the tones, yet each string retains all the harmonics which it originally possessed.

We conclude, then, that the characteristics of musical sounds, other than pitch and volume, depend upon the texture of the sonorous body by which they are produced, and the modifying influence of that part of the mechanism of the ear, the office of which is yet undetermined.

All the modifications of sound which characterize the vowel sounds, may be given in whispers, yet we do not think that whispers can be considered as musical tones. It is possible to speak, but not to sing in whispers. We cannot, therefore, accept the theory that absence or presence of the harmonics is the cause of difference in vowel sounds.

Neither do we accept the theory that harmonics are necessary to the production of good musical tones. On the contrary, they so frequently seriously interfere with good harmony, that the softening effect of distance, which renders them imperceptible, is universally acknowledged to add sweetness to music. Spohr, in his celebrated "School for the Violin," says that "the artificial harmonic tones must be rejected, because they so totally differ from the natural tones. It would be degrading this noble instrument to play whole melodies in such childish foreign tones." He, therefore, rejects all harmonics except those natural to each string, namely, the octave, the fifth of the octave, and the double octave.

The thorough investigation which is now in progress in the science of acoustics, will undoubtedly soon throw light upon some of these perplexing questions, which constitute one of the most interesting scientific topics of the time.

It has recently been discovered that cheap claret wines in France are adulterated by alum, which produces gastralgia.