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No. 170.
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LABOR AND THE COST OF LIVING.

Notice was taken last summer of the encouraging results obtained by the Massachusetts Labor Bureau in the inquiry as to the numbers of employed and unemployed men and women in that State. It will be remembered that the number of people seeking work was then about 28,500. The tenth annual report of the Bureau, just published, gives the result of another canvass, made in November, from which it appears that only 23,000 people in Massachusetts were then in want of work and could not get it. If the industrial condition of Massachusetts may be taken as an index of the industrial condition of the whole country, we arrive at the encouraging conclusion that not more than one per cent of the population of the United States began the winter unemployed. This, notwithstanding the fact that the relative proportion of those seeking employment and depending on it for support was probably much greater than ever before. Multitudes who had retired from business in flush times, had been driven to seek work again in consequence of failing investments; and for similar reasons many young people and dependents upon wealthy parents and relatives had been set adrift to crowd the labor market.

That the reduction of wages consequent thereupon, and the return of prices to a gold basis, had not brought the working people of Massachusetts, as regards work and wages, relatively below their position when gold began to go up, is shown by statistics, which we believe to be worthy of the utmost confidence.

"The following is the per centum of increase of wages in 1878 over 1860 in the several trades: Agricultural laborers, per day 33 per centum, per month 15; manufacture of arms, 19; artisans' tools, 38; blacksmiths', 47; bookbinding, 14 to 17; boots and shoes, 2·6; boxes, 13 to 38; bakers, 13 to 38; brickmakers, 9; building trades, 16; cabinet making, 6 to 16; carpet making, 23; carriages, 30; clothing, 8; dressmaking, 19; leather making, 28; linen and jute manufacture, 20 to 28; machinery manufacture, 27; metallic fine work and jewelry, 25; millinery, 23; musical instruments, 8; paints, 28; paper, 41; printing, 30; silk manufacture, 45; soap and candles, 13; stone working, 8; manufacture of woolen goods, 33; worsted goods, 22. The following are the occupations and the percentage of decrease of wages: Bleaching, dyeing, and printing of cloths, 3 per centum; preserving meats, pickles, etc., 2; envelope making, 11; shipbuilding, 32.

"The returns from 63,515 employes in the occupations considered, in the cities and towns visited, show that average weekly wages, on a gold basis, were twenty-four and four tenths per centum higher in 1878 than they were in 1860.

"It is found that the prices of groceries has advanced over 1860, 7 per centum; provisions, 28; fuel, 5; boots, 18; rents, 25; board, 49; while drygoods have fallen 9 per centum. On all the items entering into the cost of living the average price was 14½ per centum higher in 1878 than it was in 1860. The following figures show the per centum which the prices of the following articles in 1872 exceed the same in 1878: Groceries, 43; provisions, 17; fuel, 44; drygoods, 40; boots, 21; rents, 105; board, 37. On all of the above items the average per centum of cost in 1872 above the same in 1878 was 54 per centum.

"The results of the investigation relative to wages and prices are as follows: Wages have advanced, compared with 1860, 24·4 per centum, and the cost of living 14·5 per centum, which on its face shows a pecuniary advantage to the workingmen of 9 9-10 per centum.

"Careful inquiry was made by the officers of the bureau of 345 retail dealers in ten cities and towns containing a population of 530,000, to ascertain the amount, quality of goods purchased now compared with the same several years since, together with the ability to pay for the same. From these inquiries the following conclusions are reached: That the workingmen of Massachusetts, in the majority of cases, have the best quality of food, though not in so great quantity and variety as in previous years; that they are practicing a rigid economy in purchases of clothing, drygoods, boots and shoes, house-furnishing goods, and fuel; and that the majority continue to pay their bills promptly.

"Comparing this state of affairs with the previously ascertained relations of wages and prices, which shows in 1878 an advance over 1860 of 24 4-10 per centum in average weekly wages, and an average advance in cost of living of 14½ per centum, which means a pecuniary betterment of 10 per centum in the general condition of the workingman in Massachusetts in 1878 as compared with 1860, no account being made of the decrease in hours of labor in many industries—it would seem almost like stating an axiom to prophesy that, with a revival in business, a gradual decline in the prices of provisions, etc., and no cut down in wages, the condition of the workingman in this State, within a comparatively short period, will be better, considering all circumstances, than it ever has been since the foundation of our Commonwealth."

What is true of Massachusetts in this respect, there is ample reason for believing to be true of the whole country.

DANGERS OF LEAD POISONING FROM THE USE OF TINNED WARE.

According to recent investigations made, both in England and this country, it seems that we would do well hereafter to examine very carefully the tin employed in coating utensils that are used for cooking or preserving food of any kind. Since tin has fallen in price it is not very uncommon to meet with samples which contain lead to a considerable amount, evidently added to the more expensive metal with a view of adulterating it and thus avoiding loss on the price at which it is necessary to sell it. The results of this, of course, may prove serious. Dr. R. C. Kedzie, President of the State Board of Health of Michigan, in a recent report on this subject says: "I have examined a large number of specimens of tin plate, of vessels made of tinned iron, of tin spoons, and iron spoons coated with tin, both teaspoons and tablespoons, and find in almost every instance that the tin is alloyed with lead; in almost every case the lead was present in some quantity, and often in very large quantity. Nor is the lead confined to the poorer qualities of tin, but some of the highest priced and 'first quality of tin plate' contains a large quantity of lead. It is an astonishing fact that a large proportion of the tinned wares in the market are unfit to use because of the large quantity of lead with which the tin is alloyed."

The dangers that are likely to ensue from the use of articles tinned with such an alloy are these: The alloy of tin and lead will tarnish, or, more properly speaking, oxidize much more readily than pure tin; and the oxide of lead thus formed is very soluble in acetic acid or vinegar (forming "sugar of lead"), and also in lactic acid or the acid of sour milk; it will form, too, salts with malic and citric acids which exist in our common fruits, such as apples, cherries, strawberries, currants, etc. Indeed, as Dr. Kedzie very truly observes, any of our acid fruits when cooked in vessels containing any lead, or even when left in such vessels for some time, are very liable to take up some of the poisonous metal, and to become thereby unfit for food, inasmuch as all salts of lead are poisonous; and the danger is the greater because lead compounds are cumulative poisons. "A person may not be poisoned by one or two small doses, but even if a very minute dose is taken for a long time, the person may be broken in health or even lose his life."

Fortunately the test for lead is a very simple and easy one, and almost everybody has it in his power to make the application of it and determine satisfactorily whether his tinware contains any of the poisonous metal in sensible quantity. For this purpose Dr. Kedzie recommends that a drop of strong nitric acid be placed on the tinned surface by means of a glass rod or splinter of wood, and that the acid be rubbed over a space as large as a dime, warmed gently until dry, and that two drops of a solution of potassium iodide be then dropped on the spot. If the tin contains lead a bright yellow iodide of lead will form on the spot. The test is one that can be very rapidly applied, and the results are decisive.

GARY'S ALLEGED NEUTRAL LINE.

Mr. G. T. Milliken, in a letter to the Editor of the SCIENTIFIC AMERICAN, dated March 13, 1879, maintains that the explanation of the behavior of the nail, contained in the issue of the SCIENTIFIC AMERICAN, March 8, page 144, is not correct. That explanation was as follows: "At a certain point the nail leaves the sheet iron and falls to the ground, simply because, by reason of its approach to the attracting pole, it tends to fly to it, but in leaving the piece of sheet iron, the force of gravitation acts more strongly than the force of attraction, and the nail consequently falls to the ground."

Mr. Milliken's explanation is as follows: "The sheet iron armature, being polarized by the magnet, in turn polarizes the nail which is suspended from it, and this polarity (of the nail) is necessarily reversed when brought within the direct control of the magnet, or sufficiently near thereto to be more powerfully affected by it than by the sheet iron, the power of which to increase its ability to control the nail, as they both approach the magnet, depends upon its thickness and area." Mr. Milliken's explanation is essentially the same as that which he criticises. The lines of force from a magnet, it is well known, radiate from the poles and diverge as the distance from the pole increases. This can be noticed in the ordinary experiment of the action of iron filings near a magnetic pole.

The particles of the sheet iron armature of Mr. Gary are in the condition of the iron filings. Each one would separate from its neighboring particle and tend to fly to the attracting magnet if it were not held to the neighboring particles by the forces of cohesion and elasticity. The nail, however, is in the condition of a detached particle of the armature; its reversed polarity prevents its remaining attached to the last particles of the armature, and it falls, if it is not near enough to be attracted to the magnet. The lines of force of the magnet, however, act upon it just as they would upon a small iron filing and draw one end of it toward the magnet while the other end is repelled. When the armature and nail are very near the magnet, the nail is strongly attracted to the magnet, just as iron filings are strongly gathered about the pole. When the nail is at a suitable distance it is less strongly attracted to the pole, just as an iron filing is less strongly attracted to the pole at a little distance. In other words, a chain of magnetic nails, hanging together vertically by their mutual attractions end to end and suddenly submitted to the action of a strong magnetic pole placed at right angles to the chain, will separate and behave like iron filings, and also like Mr. Gary's armature and its nail. The explanation of Mr. Milliken does not differ from that given in the issue of the SCIENTIFIC AMERICAN, March 8. In short, every particle of the armature tends to fly to the magnet; the nail, which for the time being is part of the armature, also tends to fly to the magnet. This tendency necessarily implies opposite polarities in the ends of any two neighboring particles which move in converging lines of force to the magnet.