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EIGHT HOURS' WORK AND TEN HOURS' PAY.

For the past few weeks, the city of New York has been passing through a revolution which, though stamped with none of the acts of lawlessness which have too often characterized similar uprisings, is succeeding in effecting results which may produce important and material changes in the relations of capital and labor throughout the land. Organized bodies, representing nearly every industry in the city, have boldly, firmly, and earnestly demanded the enforcement of a law which is deemed necessary to protect the rights of the working man, to afford him opportunities now denied him for relaxation and self improvement, and to ameliorate a condition under which he chafes, and to which, it is claimed, he has been driven by the encroachments of capital. Questionable advantage, it is true, has been taken of a critical point of affairs. The employer with his yearly contracts uncompleted sees ruin staring him in the face in case of their non-fulfilment, and is consequently forced into acquiescence to demands which he would otherwise unhesitatingly reject. But even in face of this action, although it has doubtless engendered bitter feeling, we cannot but look with satisfaction on this comparatively peaceful revolution in contrast with the acts of atrocity which have rendered the methods of coercion, adopted by the Sheffield and other English organizations, a reproach on the whole system of trades' unions.

The unanimous movement of nearly our entire industrial population, numbering almost forty thousand souls, towards one fixed object must undoubtedly overcome all present opposition, but it remains a question as to what benefits will eventually be attained. To this, the answer can be found, not in the moment of excitement of the present, but in the future when the contest is over and the ordinary pursuits of every day life are in peaceful progress.

It is claimed that the working man when working ten hours per day has no time for recreation or self education, and that owing to the "magnificent distances" which he generally has to travel in this city to reach his place of work, his hours of rest are even further curtailed. Rapid transit will eventually obviate the last mentioned difficulty; but without animadversion on the laboring classes in general, it is but fair to ask who out of the great masses would devote their spare time to the acquirement of useful knowledge. The machinist, the carpenter, are the types of a class who would doubtless labor to perfect themselves in their several callings, but we hardly think it probable that the same would be the case with the large numbers who, without any special trades, are simply "day laborers." These men would be in idleness for a portion of the day and, being without resources or incentives for self improvement, would sink to a condition undeniably worse than that which they at present find burdensome. The record of those countries where the people are most idle shows them to be least advanced in industrial progress. Spain, where the laborer spends half his time sleeping like a dog in the sun, can hardly be compared with the nations of the North, where the artisan works his four "schofts," sixteen hours per day.

The question as to whether the condition of the workman will be bettered, or whether he will be in any measure re-

leased from the sway of capital through his working but eight hours per day, is in our opinion at best doubtful. In fact, it appears that the capitalist or the employer is actually, in the end, the gainer. It needs no great perceptive powers to see that, if a manufacturer pays, for eight hours' labor, the same sum that he formerly paid for ten hours, his manufacture will cost him more, and to make any gain he will be obliged to increase his prices. If this be true of large producers, it is equally true of small ones; the grocer, the butcher, all will follow, and the workman will discover that he will have to pay increased prices for his daily wants with precisely the same income that he had before the number of his working hours was lessened.

It might be suggested that he could devote his spare time to some labor whereby he could make up this deficiency. Even if he could so do, he would simply complete the circle, and find himself at the same point from which he started, with a poorer prospect of improving his condition than when he began; but the short sighted policy of the Unions forbids him. From the reports of late proceedings, we learn that the application of a well known manufacturer for permission to employ his men for over eight hours daily, coupled with an agreement to pay them extra compensation for extra time, was peremptorily refused. This we consider an assumption of power which is both illegal on the part of the Unions and unjust toward their several members. Not only does it embitter the feud between employers and employed, but it tends to destroy what seems to us as the fairest and most equitable method of settling the present difficulty and preventing its occurrence in the future. If every man worked by the hour, he could labor six or sixteen hours per day just as he chose; did he wish more time for self education, he would have but to take it; or, was he driven by poverty, extra work would enable him to attain independence.

We uphold the right of working men to associate and form Trades' Unions or Cooperative Societies as they think proper, but when they essay to restrict the right of every one to sell his labor to whoever will pay him most for it, to place the poorest work on a level with the best, or to dictate as to the amount of work which shall be performed in any space of time, we maintain that their action is both arbitrary and unjust, and that its tendency is only to defeat that cause which it should be their sole aim and endeavor to promote.

INFORMATION ON GUM COPAL.

As every day more uses for the resins and gums, of which copal is one of the most important, are discovered, and as a difference of opinion even exists in regard to its properties, one correspondent recommending to dissolve it in alcohol (question 7, page 233, and an answer on page 281), while another correspondent reports that he finds "that alcohol will not dissolve copal," it may be desirable to give some information in regard to this important substance.

It is unfortunate that no proper distinction is made between the use of the words *gums* and *resins*. We should like to confine the first name to all those vegetable exudations which are soluble in water, as gum arabic, gum tragacanth, etc.; while we would call resins those which are insoluble in water, but soluble either in alcohol, ether, turpentine, or their equivalents, as is the case with common resin, and thus not speak of gum copal, gum dammar, gum lac, gum elastic, etc., but call them resins. Some of these, however, consist of a mixture of a gum proper with a resin; such is the case with gambouge, assafetida, and a few others; but the so-called gum copal is a true resin, insoluble in water.

There are four kinds in the trade. (1) The Brazilian and West Indian copal; (2) the African and East Indian copal, collected chiefly in Madagascar and the neighboring region; (3) the North American copal; (4) the soft or false copal, which comes sometimes from Brazil, and is sometimes found mixed with the East Indian copal. Fossil copal, found in the clay at Highgate, near London, England, and in the auriferous alluvium at Bucarmanza, in the province of Soccore in New Granada, is also sometimes received from the East Indies, and is not to be confounded with the resin which flows from the copal trees on to the ground between the roots; and being very impure, full of earthy material, is sometimes also called fossil or mineral copal.

The copal as found in commerce consists usually of flat rough pieces of different shapes and sizes. The physical properties are by no means uniform, varying with its origin. Generally, the pieces are not clear outside, but inside clear and either nearly colorless, yellowish, or brownish, and including insects or parts of plants; sometimes the pieces are so dark colored as to be only slightly translucent. Their substance is quite hard, shows a very smooth and conchoid fracture, is easily pulverized, and does not stick together again, even when chewed. At 122° Fah. it becomes slightly soft. The specific gravity varies from 1.045 to 1.14, and it thus sinks always in water.

The properties of the different copals in regard to solvents are found to be very various, according to the origin; the American copal, for instance, is much less soluble in alcohol and oil of turpentine than the East Indian copal. But the copal takes oxygen from the air, or oxidizes, especially when pulverized and kept long in a dry, warm, airy place; and then it becomes much more soluble in alcohol and oil of turpentine. The solubility also increases by melting at as low a temperature as possible; but the American copal is more difficult to melt, becomes darker, and often remains after all so insoluble as to be totally unfit to make varnish of. Sometimes such copal may be dissolved when pulverized, or placed in a bag and exposed to the vapors of hot alcohol, when the soluble portions slowly dissolve out and drop in

the liquid below; the previous solution of some camphor in the alcohol has been recommended. Unverdorben recommends to digest two parts copal with three parts of absolute alcohol for twenty-four hours; the insoluble portions will then dissolve in the concentrated solution of the soluble parts. But with some kinds of copal, this does not succeed. In ether, the copal swells up into a sirupy mass. Heating this and adding slowly small portions of hot alcohol of 0.82 specific gravity, a clear solution is obtained; if, however, the alcohol is added cold and at once, the copal precipitates, and can no more be dissolved.

Petroleum dissolves only one per cent of copal, turpentine a little more; two parts of copal form with one part of turpentine a thick fluid mass: and on adding more turpentine, the copal coagulates. The pulverized and oxidized or carefully melted copal dissolves more easily in other ethereal oils. The best way is to melt the copal in a glass flask, at as low a temperature as possible, and to add gradually turpentine heated to 212° Fah.; if the latter be added too suddenly, the operation fails. Bisulphide of carbon dissolves copal only partially; oil of caoutchouc better, even without heat. Concentrated sulphuric and nitric acids dissolve the copal perfectly; but by a slight elevation of temperature, a decomposition and destruction takes place.

Alkaline solutions dissolve copal easily, by help of heat, and a peculiar aromatic flavor is perceived. However, such a solution cannot be used for varnish, as it becomes milky on cooling; even the clear gelatin, made by ammonia dissolved in alcohol, is a clear solution which becomes as white as chalk when dry.

Finally, chemical analysis has shown that copal consists of half a dozen or more resins, of different qualities mixed in different proportions, and which have been called after the letters of the Greek alphabet, *alpha resin*, *beta resin*, *gamma resin*, etc. They have been analyzed by Unverdorben and found to possess quite different properties in respect to composition, chemical and physical characteristics, solubility, etc. But none of the copal resins can produce succinic acid, as is the case with the amber, which is much like the copal, but is, as is well known, a fossil product of more uniform properties and easier solubility.

The so-called gum dammar is very much like copal, and is often sold for the same, and is even preferred for its greater solubility. The varnish is not so hard, however. It must be well dried, otherwise it gives no clear solution. The solution is easily performed in two to three parts of boiling turpentine, then diluted with thick turpentine or boiled linseed oil.

THE UNITED STATES SENATE ON COMPENSATION TO INVENTORS.

The United States Senate lately proceeded to the consideration of the House bill directing the Secretary of the Navy to pay to R. M. Green the sum of \$10,000, as payment in full for the use by the Government of his patent machine for bending chain cable links and connecting shackles, and tackle hooks.

Mr. Cragin stated that a board of officers had examined into the matter and had estimated that the use of the machine in question in the Washington navy yard, where Green is a mechanic, had saved the Government during the last four years \$40,000 in labor alone. He thought the sum proposed very small, as the board had reported the machine as worth \$50,000.

Mr. Logan wished the bill amended so as to purchase the patent itself, and not merely the use of the machine. He said the universal practice in the Government navy yards, which he did not justify, however, had been to require mechanics to assign the use of their patents to the Government for the consideration of one dollar. Army and navy officers were not entitled to a royalty from the Government for any invention or patent of their's. He considered this bill violated this general principle, and that the sale of the patent itself should be made absolute if the money were appropriated.

Mr. Ferry, of Michigan, said it was well known that the mechanics, who are taxing their brains by inventions for the benefit of the Government while in its employ, are paid only the wages of daily labor, and if they were treated in the way described there would be no stimulus to them to try to economize either time or money. He believed the just course would be to fix a fair, moderate compensation to the mechanic, that he might be stimulated to invention.

The further consideration of the bill was postponed.

The bill authorizing a settlement of the claims made by the estate of the late Rear Admiral Dahlgren was afterwards taken up, and read a second time.

This bill proposes to refer the claim of the Admiral's widow, who administers to his estate, to the Court of Claims, whose duty it shall be to hear and determine: first, whether Admiral Dahlgren was the original inventor of the Dahlgren gun and projectiles described in his several patents, and, second, what amount of compensation, if any, his estate is justly entitled to receive for the use of his inventions and patents, and for a full and entire transfer of the latter to the United States. In determining the amount, the court is to take into consideration the facts that, while Dahlgren was engaged in perfecting the inventions for which the patents were granted, he was an officer in the United States Navy, and his time, services, and skill were due to the United States, who paid the expenses of the experiments, etc., made by him.

Mr. Stockton thought that if this bill had been drawn with the express view of meeting the objections made by the Senator from Illinois in the previous case, it could not more perfectly have done so. He thought every difficulty