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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

made by the Senator to the other bill was obviated. It was quite impossible for the Senate committee to fix the sum, supposing Admiral Dahlgren's estate was entitled to compensation, and he could see no means of adjudicating in the matter better than referring it to the Court of Claims.

Mr. Logan said the mere reference of the matter to the Court of Claims would be an admission by the Government that it owed something, and that the Court was referred to to ascertain the amount. They would thereby establish the principle that the use of every invention used by the Government must be paid for. The Dahlgren gun is a good one, it was true; but the fact that it was used in the army and navy today did not justify them in paying an amount of money for it, if it were done in violation of a principle that the Government ought to establish. This principle was that where officers in the employ of the government, drawing a salary, devote their time to perfecting inventions, the invention ought to be the property of Government. All his remarks, he said, were made in order to record his protest against the establishment of a wrong principle which would eventually cost the Government millions of dollars.

On the suggestion of Mr. Windham, the Secretary read from an opinion by Judge Holt on a decision given by the Chief of Ordnance, General Dyer, wherein the General took the view held by Senator Logan. The opinion stated "that no precedent has been discovered in which the 'principle' understood by General Dyer to be an 'admitted' one has been in any manner acknowledged. On the contrary, there are believed to have been repeated instances in which the opposite view has been taken by the Government."

Mr. Sherman thought no one could question the fact that Admiral Dahlgren had a property right in the use of his invention. When the government granted a patent, it recognized an existing property right in the patentee for a certain invention, and it had no more right to appropriate that property right than any individual had.

The bill was reported to the Senate without amendment, and ordered to be read the third time.

THE SEWING MACHINE RING IN A NEW ROLE.

The application, made to Congress by the Sewing Machine Ring for the revival of the expired Wilson patent, has utterly failed and the case has been withdrawn. But the same parties have put in another appearance, fully determined to obtain an extension of their monopoly in some shape or other. They have now applied, as the assignees, for the revival of the old Akins and Felthousen patent, which was originally granted Aug. 5th, 1851 for fourteen years, and then extended for seven years. This extended term ends on the 5th of August, 1872, when the patent becomes the property of the public, unless Congress interferes by a special act for its further extension.

The Akins and Felthousen machine, as originally patented, was a crude device, widely different from the present mechanisms. But by reissue, with claims unfairly broadened, and by act of Congress, the assignees hope to be enabled to prevent all other sewing machine inventors and manufacturers from producing their goods. They anticipate that the public will thus be compelled to continue to buy sewing machines, of the Ring exclusively, at exorbitant rates.

In our previous discussions of the sewing machine business, we have shown how gigantic is the monopoly now wielded by the small clique known as the Sewing Machine Ring; how they oppress our poor working people by charging them from forty to sixty dollars for the same sewing machines that they sell, at a great profit, for half the money on the other side of the Atlantic, where they enjoy no patent monopoly; and how they have always opposed other makers and inventors of improved machines, by refusing to grant them licenses on reasonable terms. It is needless for us to go over these charges again. Their general correctness remains undisputed, and they apply with equal force to the Akins and Felthousen case as to the Wilson patent and the other patents controlled by the Ring.

The public is tired of the exactions of these sewing machine monopolists. They have grown immensely wealthy; they have reaped the richest rewards for whatever they have done in developing the business. We earnestly hope that Congress will turn a deaf ear to this new petition, and let the sewing machine monopoly die a natural death.

Fatal Boiler Explosions.

The boiler of the *Epsilon* tug boat exploded at the foot of Burling Slip, East River, New York, at half past one p. m., on Monday, May 27. The captain and fireman were killed; the boat was totally destroyed, the fragments being scattered over the adjacent streets. Several minor casualties occurred from the disaster. It is stated that the boiler was in good repair, having been recently examined and tested.

A new boiler at Philadelphia exploded on the same day, causing one immediate death and fatally wounding one person, besides injuring five others. The engineer was the man killed, and we are informed that he had chained down the safety valve to get up steam. Mr. L. Phleger, the well known boiler inventor, discovered the criminal act, and was removing the chain when the explosion occurred. Mr. Phleger escaped uninjured.

AN extensive coal bed of remarkable depth and excellent quality has been struck near Raus, at Schonon, Sweden. At a depth of 566 feet, eleven strata of coal had indeed been pierced, but none of these exceeded in depth 1½ feet. Five feet farther down, however, a bed was struck with a thickness of 8½ feet. The borings have been continued, and are believed to prove satisfactorily the existence of an extensive coal bed.

SCREW ELEVATORS.

One of the earliest and probably the safest form of hotel or passenger elevators ever introduced was the screw elevator invented by the late Mr. Tufts of Massachusetts. It consists of a large revolving screw standing in the center of the hoistway and reaching from top to bottom of the building. To the elevator platform is attached a nut, which fits the screw, and the revolutions of the latter carry the platform up and down with great regularity and perfect safety, the platform being in fact a part of the nut. No lifting ropes are employed, and passengers riding upon the machine, if they understand its construction, enjoy a sense of security which they never can have when they trust their lives to suspension ropes and safety clutches.

In view of these considerations, it is with regret that we learn that the proprietors of the Fifth Avenue hotel in this city have determined to remove the excellent screw elevator, that has served their guests with so much safety and success for many years, for the purpose of putting in a more recent patent suspension rope elevator. We shall miss a good old friend when the screw is gone. It is a noble piece of mechanism, and we always admired its massive proportions and stately movements. It is still in splendid order, capable of useful service for a hundred years to come, and whoever obtains it will possess an enduring and effective machine. It is true that the screw elevator obstructs the platform and moves a little slow. But for passenger use safety is the first consideration; roominess of the platform and speed come second. The Continental hotel, Philadelphia, is provided with a screw elevator, the counterpart of the Fifth Avenue machine.

The Vienna Exposition of 1873.

The Archduke Rainer, President of the commission for preparing the necessary arrangements for the Exposition of 1873, has, in a circular dated March 20, 1872, made known that the owners of the beet sugar factories and sugar beet farms of Austria have authorized him to offer the following prizes for the best cultivators and machinery for harvesting sugar beets:

- 1,000 and 500 dollars respectively for the two best beet sowing machines.
- 250 dollars for the best harrow or land roller.
- 50 dollars for the best beet weeder.
- 500 and 250 dollars respectively for the two best beet cultivators.
- 1,500 and 1,000 dollars respectively for the two best beet harvesters.
- 100 dollars for the best beet cleaning machine.
- 100 dollars for the best hoe.
- 150 dollars for the best tool for raising the roots out of the ground.

All machines and tools competing for these prizes have to be delivered at the grounds of the Exposition prior to the month of March, 1873, excepting the harvesting machines which will be accepted as late as September, 1873. All machines and tools will be practically tried on fields of beet roots and in all kinds of soil, unless specially intended for certain qualities of soil and so specified. Awards will be made not later than November, 1873, but only for machines found to be entirely new and fully answering the purposes for which they are intended.

As regards other machinery intended for the Exposition from foreign countries, information is given that all working machines should be announced at Vienna prior to August 1, 1872.

The Inventor of Puddled Steel.

Anton Lohage, the inventor of puddled or wrought steel, died on April 21st, at Unna, in Westphalia. Being the son of a poor peasant, he was sent to an elementary school, and when twelve years of age, he entered the service of a richer peasant as sower, and passed through all the stages of an agricultural laborer. When twenty-one years old, he went to work at a factory, and developed there such skill and capacity that he was sent for two years to the factory school at Hagen, where Director Grothe improved him so much that he could be sent with advantage to the Polytechnic School of Berlin, where he studied for three years, and supported himself, partly by a small purse which was granted him, partly by working as a chemist in a factory. In 1848, he began his trials at the Haspe Iron Works, near Hagen, in Westphalia, and after some time he succeeded in producing steel of good and uniform quality by the ordinary puddling process. His invention was patented, 1850, in England by Ewald Riepe, and introduced at Low Moor; but owing to the quality of the pig iron, its use was very limited in England until, in 1853, Mr. William Clay introduced the process on a large scale at the Mersey Steel and Iron Works, Liverpool. In Germany, about 100,000 tons of puddled steel are made every year, and it forms the principal material for Krupp's celebrated cast steel.

FIREPROOF BUILDINGS.—If you will have wood floors and stairs, lay a flooring of the thickest sheet iron over the joists, and your wood upon that, and sheath the stairs with the same material. A floor will not burn without a supply of air under it. Throw a dry board upon a flat pavement, and kindle it as it lies if you can. Prevent drafts, and, though there will be fires, no houses will be consumed.

YEDDO, the capital of Japan, has lately suffered by a great conflagration. Five thousand buildings were burned, comprising 17 large government offices, 60 temples, 287 smaller government offices, and 4,753 dwellings, shops, etc. 20,000 people were rendered homeless. It is to be hoped that the Emperor will now order some steam fire engines.

Alloys of Copper and Zinc.

These two metals will mix with each other in all proportions. The color of the alloy varies with the proportion of zinc present, from almost copper red to zinc white. The alloys are made by mixing granulated copper and zinc in proper amounts, placing the mixture in black lead or Hessian crucibles, and putting these in a suitable furnace. The alloy must be removed as soon as melted, since by exposure to a high temperature it loses zinc.

Several of these alloys have received distinctive names. Pinchbeck contains 6 or 7 parts of zinc to 94 or 93 parts of copper. It has a reddish color, resembling red gold, and was formerly much used for watches and jewelry. When pale gold became fashionable, the alloy was also changed and it was called oroide; this consists of 10 parts of zinc to 90 of copper. Another alloy which is frequently used as a base for gilded articles is called tombac, and contains from 20 to 30 parts of zinc, and 70 to 80 of copper. Dutch gold, which is used for imitation of gilding, is composed of 14 parts of zinc and 86 of copper. This is malleable, and can be hammered into very thin sheets.

Brass contains 33.3 parts of zinc, to 66.7 parts of copper, varying, however, somewhat from those proportions according to the use that is to be made of it. It has several advantages over pure copper, besides being cheaper. It is much easier to work in the lathe, being harder and not so tough. It will also make perfect castings, which are hard to obtain from pure copper. A little lead is frequently added to brass, as it is not so tough and does not clog the file when containing about one per cent of this metal. Prince metal and mosaic gold are of the same composition as brass.

Ormolu contains equal parts of copper and zinc. Muntz or yellow metal differs from other brass in that it may be rolled when hot; it contains 40 parts of zinc to sixty of copper. The ordinary hard solder for brass may be made by melting two parts of brass with one of zinc.

Sterro metal contains, besides copper and zinc, a little tin and iron; it is very hard and has been proposed as a substitute for yellow metal in sheathing ships. Mallet's brass, which is used for protecting iron from oxidation, contains 254 parts of copper to 746 of zinc.

A Fowl Obstruction.

A late number of the Des Moines (Iowa) Register says: "A singular case of railroad obstruction, and one for which no remedy is provided by the statutes, occurred a few evenings since on the Valley road in Green county. Conductor Livingston's train, when about three miles this side of Grand Junction, in passing through some low country and near a pond, ran into an immense flock of swan, brandt, geese, and other wild fowl. The birds were just about to alight on the track as the train drew near. Their number was so great that the sky was filled with them, and those above pressing down on the lower strata forced them to alight on the car tops. The engine, tender and cars were covered with the fowls, and some even clung to the bars of the cowcatcher. One stately swan had a wing injured in the crush, and then found a resting place on the engine head light, whence he was taken by the engineer. The bird, however, managed to escape from custody near Perry, and jumping from the tender where he had been tied, disappeared in the grass. The raid continued several minutes, quite a number of the aerial army being run over by the train, and some half dozen being captured by passengers and train men. As soon as the birds on top of the flock began to understand the situation, they soared away, followed by the entire covey. Livingston says it was the biggest crowd of dead-heads that ever tried to board his train."

GOOD WOODS.—Do not be above your business, no matter what that calling may be, but strive to be the best in that line. He who turns up his nose at his work quarrels with his bread and butter. He is a poor smith who quarrels with his own sparks; there is no shame about any honest calling; don't be afraid of soiling your hands; there is plenty of soap to be had. All trades are good to traders. Above all things avoid laziness. There is plenty to do in this world for every pair of hands, and we must so work that the world will be richer because of our having lived in it.

Show me the person who complains of mental weariness, and I will find in him a torpid liver, obstructed kidneys, a dyspeptic stomach, constipated bowels, or an inactive skin. If the brain worker does not sleep enough, nor exercise enough, nor eat enough, or if he eats too much, or takes improper food, his digestive organs run down, and the clock-work of the brain, having no way to reconstruct the machinery through which it receives impressions and transmits volitions and impulses, is obliged to cease work.

The moral is, in brief, keep the body in health, and the brain will take care of itself, work it all you can.—*Dr. Trall.*

The corporate authorities of Boston have decided to fill up that large portion of useless harbor mud known as the South Boston Flats. Seven hundred acres of valuable land will thus be reclaimed and added to the taxable property of the city, to say nothing of the augmentation of business and business facilities which will attend the consummation of the improvement.

To light the streets of London, 630,000 gas lights are employed, which consume every twenty-four hours 22,270,000 cubic feet of gas; and if the streets of the metropolis were put together, they would extend a distance of about 4,000 miles.