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**PURIFICATION OF LUBRICATING OIL.**

Oil for lubricating purposes is very high at the present time, and should be carefully used. Much of it is not only lost by improper use, but is actually thrown away by persons who are too reckless or naturally too wasteful and regardless of their own property to take any care of that belonging to others. It is a little singular that men who are thought unfit for higher positions are generally made to oil the shafting in factories, where they can waste a gallon every day by slovenly and stupid use of it.

When oil is poured on a bearing, if the shaft be in motion, it takes up a supply enough to cover the surface, while the superfluous runs off at the nearest outlet. If there happens to be a drip pan underneath the hanger, the oil is caught, and when the pan gets full, the contents are summarily thrown out of doors into the nearest waste hole.

Although much of this oil is full of metallic dust, the result of wear, that does not prevent it from being used again when properly treated to remove the foreign matters. This can be done so simply and so easily, that we think much economy to manufacturers will result from the adoption of the following process:—

When the oil is taken from the drip pan, it should be poured off carefully, so that the heaviest part of it, which settles at the bottom, may be treated separately. The lightest or upper portion should be put in a vessel and heated gradually to a little below the boiling point of water. From this vessel it should run through flannel, to filter it, which will remove the finest metallic dust held in suspension by the oil. From this filter the oil will come out semi-transparent, but in a great measure free from the grosser impurities. A filter of animal charcoal, or coal made by burning bones, should then be used, which will detain the dirt that still remains behind, and render the oil fit for use again for most purposes.

Oil thus treated will not have the bright and clear appearance of that bought in barrels, but it will be very good, and may be used, over and over again with comparatively small waste. Animal charcoal can be had of all wholesale druggists.

For large works, it would be profitable to have a place prepared particularly for the object of purifying the waste oil by the means above described. Other and more complicated processes are employed by refiners to extract impurities from oils, but they are obviously unsuited to persons not acquainted with

chemical changes and affinities, and would be useless to our readers. We do not see why it would not be a profitable scheme for those versed in such matters, to collect the waste oil from drip pans and render it pure again for a small sum per gallon. It is not only the spent oil which falls into these drip pans, but that lavishly poured over the hanger by the oiler, so that the contents are very different from common slush. The process above described has been tried on a large scale and is not a mere experiment.

**GOOD WILL.**

Among the many contrasts between aristocratic and democratic communities, one of the most important in its effect upon human happiness is the great difference in the degree of sympathy between individuals who chance to be in different positions or pursuits.

One of the most impressive pictures in the Dusseldorf gallery was that representing the grinding tyranny in which the poor weavers of Silesia are held by their employers. The famous poet, James Hogg—the "Ettrick Shepherd"—was invited by some of the nobility of England to visit them at their houses, and he said that while, in directly addressing him, they were perfectly polite, he could see, in their talking with each other, that they regarded all those belonging to the non-noble classes as an entirely distinct people—as distinct as the planters in our Southern States regarded their negro slaves. No one can come in contact with any portion of English society without perceiving that it is pervaded with this sentiment of class. The universal feeling is, that persons should be taught to know their place, and that they should not attempt to rise above their position. The desire is quite as strong to keep others down as to get up themselves. This is seen even in their charities, which take the form of alms-giving, and degrade the recipients.

On the other hand, in democratic communities, the general spirit is to give every man a free chance to rise just as high as he can; and even in many cases to give him a friendly lift upward. How uniformly have the great sums, so lavishly given away in this country, been directed to elevate in the scale of humanity the least favored portions of the community! See the wealth of the country everywhere voluntarily burdened with a heavy tax to provide free schools for the children of all. See the Cooper Institute, in this city, with its magnificent reading-room and its admirable lectures, free to all comers. See the Astor Library, the Lawrence Scientific School, and hundreds of similar establishments scattered over the country, all designed to aid the poor and friendless in elevating their nature and position.

Along with this kindly feeling there is one also of mutual respect. Generally the native born American who employs men in his manufactory or his business, looks upon them as fellow citizens, and not as hostile and degraded enemies. He has an instinctive consciousness that the practice of petty tyranny is degrading to the one who practices it, as well as to the one upon whom it is inflicted; and that there is infinite dignity in the observance of many courtesies towards all with whom he has to deal. There is also a quiet self-respect among workmen, in striking contrast with the extreme severity generally observed abroad.

We have sometimes thought that the rapid growth of wealth, the increasing congregation of people in large cities, and the influence of foreign immigration, both of employers and employed, were tending to build up a hostile class-feeling in this country; but it is probable that these influences are more than counteracted by those of an opposite tendency—that the steady growth of democratic principles, the equality of all men before the law, popular suffrage and free schools, are spreading more and more widely among the millions of our people the spirit of universal good will.

**STARCH AND SUGAR.**

One of the principal ingredients of grain, seeds, roots and tubers, is starch. It is found more or less in all plants and trees. Nearly four-fifths of the solid part of the bread we eat is starch.

Mix common flour and water; strain through muslin; the milky strained fluid contains starch, which

soon settles as a white powder. Rased potatoes yield starch in the same manner. The substance remaining upon the muslin, after straining, is gluten, which gives cohesion to the flour in bread.

Water does not dissolve starch, but the granules absorb water, causing them to swell and unite into the form of a jelly. It is this swelling of the starch in rice, beans, peas, etc., that causes this enlargement during cooking.

If roasted to a yellowish brown color starch is so changed as to be soluble in water, and is then called dextrine, which is extensively used to thicken colors by calico printers; also by confectioners in making fig paste and other sweet compounds.

To make sugar out of starch heat it hotter than for dextrine; then make it into paste with water; then gradually add a small quantity of water slightly acidulated with sulphuric acid; then boil till transformation is complete, the result being sugar sirup. To remove the acid, add slaked lime, filter, evaporate the sirup, and you have grape sugar. An infusion of malt may be used instead of the dilute acid.

As a sweetener, cane sugar is far superior to grape sugar—1 pound of the former is equal to 2½ pounds of the latter. But the manufacture of grape sugar is so easy that it is extensively used in Europe to adulterate cane sugar.

Grape sugar can be readily made from cotton and linen rags, and also from saw-dust; 5 pounds of poplar wood will yield 4 pounds of grape sugar.

Chemical research indicates that starch and wood ought to be more easily converted into cane sugar than into grape sugar, but no method of making cane sugar from the above substances has yet been discovered. Such a discovery would be of immense value. Here is a grand subject for invention.

**SAFES.**

English business circles are just now agitated over the success of burglars in breaking into their strong boxes and rifling them of their contents at short notice. The principal agents used by the rogues in effecting an entrance are wedges. These are made of steel drawn down as thin as a knife edge at the point and very slow in taper; a small crevice where the door shuts in is sufficient to enter the wedge, when a few blows of the hammer and the subsequent insertion of stronger wedges forces the crack open so far that a crowbar can be used, and the door is wrenched open in a twinkling.

Simple though it may appear, the construction of safes which are thief and fire proof has involved much thought and kept a great deal of capital employed. The expedients adopted to secure both ends are various and need not be adverted to in detail since the citation of them would be tedious. Chilled iron safes have been proposed and are now in use in many cases, but these, although proof against a drill, are not against a sledge or percussive force of any kind. Steel plates alternately interposed between wrought or chilled iron have also been used, and are good defenses against drilling, for the time required to soften a hardened steel plate, so that a drill would cut it, is too great and too tedious to be undertaken by burglars.

Moreover thieves are not the class of men who are fond of industry, as a rule. If a sufficient reward is set before them they strain every sinew to win it in the shortest time, but with a limited prospect of success not many steel-plate safes will be drilled or softened by a blow pipe, as a foreign contemporary suggests they may be, at the point of attack.

Safes with small balls placed beneath the exterior plates have been invented, the idea being that when the drill penetrates the outer sheet the point striking one of the balls causes the latter to turn so that any penetration is impossible. So far as drilling is concerned there is a possible barrier to it, but a hole once made in the outside affords an entrance for gunpowder, so that in this respect such safes are extremely vulnerable. Besides when a hole is drilled in the outer plate the balls might be taken out.

The principal modes of rifling safes in this country is by this latter method—powder; and as yet we have had but little loss from bursting or prying open safe doors. As ill news travels fast, the success of thieves across the sea, in breaking open safes in the manner previously spoken of, will soon reach members of that ancient but not honorable profession here; we should