

factory. The hoisting of three sheets of wool or opa, each weighing about 6 cwts., did not occupy more than seven minutes, and the quantity of water consumed in the process was about 120 gallons. A series of experiments followed, and, including the sheets raised in the first experiment, no fewer than fifteen sheets of wool, weighing in the aggregate 3 tons 15 cwt., were raised from the ground floor to the highest story in the warehouse in the short space of forty-five minutes. The entire quantity of water consumed was only 570 gallons, the cost of which was about 6½d.—*Scientific American*.

## Miscellaneous.

### Nitro-glycerine.

In the *Mechanics' Magazine* for August 11 an account was given of some Swedish experiments with that highly explosive compound, nitro-glycerine, which Mr. Nobel, a Swedish engineer, is endeavoring to bring into use, instead of gunpowder, for blasting purposes. The "blasting oil," as Mr. Nobel calls it, has since been experimented with in Cornwall, with very satisfactory results. It is an oily fluid, of a light yellow color, and of 1.6 specific gravity. It consists of three atoms of nitric acid, or 3 NO<sub>5</sub>, combined with one atom of glycerine or C<sub>6</sub> H<sub>5</sub> O<sub>3</sub>, so that its ultimate composition may be represented by C<sub>6</sub> H<sub>5</sub> O<sub>18</sub> N. It bears the temperature of boiling water without explosion or injury, but explodes at about 360° Fahrenheit. The changes which occur during explosion convert each volume of it into 469 volumes of carbonic acid, 554 volumes of steam, 39 volumes of oxygen, and 236 volumes of nitrogen, being a total of 1,298 volumes of gas for each volume of the liquid oil. The gases produced by the explosion of gunpowder measure, when cold only 250 times the bulk of the gunpowder exploded, so that, supposing the gases evolved to be in each case at the same temperature, nitro-glycerine would thus be five times more effective than its bulk of gunpowder. A great deal more heat, however, is generated by the explosion of nitro-glycerine than by the explosion of gunpowder, and the gases produced by the explosion of the former are therefore in so much higher a state of tension than those produced during the explosion of the latter that the new agent is really thirteen times more effective, bulk for bulk, and eight times more effective, weight for weight, than the old. The use of nitro-glycerine in blasting, therefore, enables thirteen times more disruptive force to be applied, by means of a hole of a given size, than can be brought to bear by means of a bore of the same dimensions when gunpowder is used, and one result of its substitution for gunpowder, for blasting purposes is thus a very great economy of labor. When there are rents in the rock in which the bore is made, the advantage of nitro-glycerine over gunpowder is greater than thirteen to one, amounting, indeed, to between twenty and thirty to one, by reason of the explosion of nitro-glycerine being so much more rapid than that of gunpowder that the force of its explosion is not appreciably diminished by fissures in the bore, which would diminish the effective force of an explosion of gunpowder by fifty per cent. For the same reason,

"tamping is never required, a shaft of loose sand being sufficient in all cases. Hence, accidents in charging are impossible, besides the saving in time." Other advantages of nitro-glycerine are that, "being insoluble, discharges under water or in water-carrying rocks may be effected by it without cartridges; and, as the blasting oil can only be exploded under certain conditions, and by means of igniters manufactured specially for the purpose, its storing and transport involve no danger." Curiously enough, contact with fire is not sufficient to ignite it at ordinary temperatures, neither is contact with phosphorus, or even with potassium. The chief danger in its use is from its intensely poisonous qualities, but these can be effectually guarded against without much trouble. At present nitro-glycerine is more costly than gunpowder, in about the proportion in which it is more effective, so that, for charges of equal force, nitro-glycerine and gunpowder cost about the same. The saving of labor and time which results from the use of the former, however, renders it by far the more economical agent of the two.—*Mechanics' Magazine*.

### Condensed Ale.

Condensed ale is among the latest discoveries. It is the invention of a citizen of Rochester, N. Y., and he claims by this method the ordinary extract of malt and hops is reduced seven-eighths in quantity, and to the consistency of sugar-house sirups, without throwing off any of the volatile matter, or aroma which brewers seek to retain, if possible, not always with success. The heat applied in cooking the extract is steam, and burning of the liquor is entirely avoided, so that, by the peculiar method of brewerage and condensation, the ale is allowed to retain all the finer qualities that impart to it the rare spirit that "cheers but not inebriates." The condensed product is put up in ale-casks, and may be shipped to any part of the world unspoiled by heat or climate. This is the greatest advantage which is claimed for it.—*American Artizan*.

### Magnesium in the Ocean.

It has been estimated that the ocean contains 160,000 cubic miles of magnesium—a quantity which would cover the entire surface of the globe, both sea and land, to a thickness of more than eight feet. In obtaining salt from sea water, the residuum is largely magnesium. It constitutes 13 per cent. of magnesium limestone, a rock found in all parts of the world in enormous quantities. Three years ago all the chemists who had obtained it probably did not possess an ounce among them. One year ago its price was 112 guineas (about \$600 in gold) per pound! Now owing to improvements recently introduced magnesium wire is sold at *threepence per foot*. It has been suggested that when it shall be cheap enough, vessels of war should be built of it, for whilst but little heavier than "heart of oak," it is as strong and tenacious as steel.—*American Gas-light Journal*.

Old age has deformities enough of its own; do not add to it the deformity of vice.

Parties at a dead lock should extricate themselves with a skeleton key.