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Contents:

(Illustrations are indicated by an asterisk.)

A POINT OVERLOOKED.

A bill is before several State Legislatures to reduce the hours of labor from ten to eight.

It is not by any means unnatural that men should seek to lessen the hours they have to work to gain a living. The capitalist is endeavoring to do it as well as the poorest laborer—all seek immunity from labor by laying up riches. It seems to us, however, that in trying to enforce their views by law, our friends have only considered one side of the question, and left an important point unguarded, by which all their efforts will be neutralized. A law may be passed to make eight hours legal, and more illegal, as a day's work, but what of the wages?

In that shop where eight hours constitute a day's work, the wages will be in keeping, and to benefit the workman, a law will have to be passed requiring employers to pay ten hours' wages for eight hours' work, which is like obliging one to pay five dollars for a four dollar hat.

The natural effect will be to drive capital to other localities where no laws hamper it, where it can work to the best advantage. Manufactures flourish best where there is as much freedom for the workman to come and go, to stay or remain, as for the employer to do the best he can with his means. Most of the complications which occur between workmen and their employers, arise from their arraying themselves against each other, when a little consideration would show their interests to be identical. Those who are so actively engaged in putting this measure in force may be the first to regret it. It is with the employed as it is with the employer in the matter of wages. There will be a market price for eight hours' labor, and another for ten hours' and those who are anxious to get on in life will work where they can make the most money.

Those who are zealous for the eight hour system would think it a hard case if they were compelled to pay $100 a month rent for a house when they can get as good a one for $75, and they would soon change the aspect of affairs by moving to some other location. Manufacturers will so act if they find the system which is recommended detrimental to their interests.

THE PASSAGE OF HEAT THROUGH WATER.

As water and heat perform a great part in nearly all the arts and operations of life, a correct understanding of the relations of the two to each other is of the very highest importance.

On another page will be found an account of a singular collection of ice on the mouth of a pipe twenty-five feet below the surface of water at the Detroit Water-works; the account being accompanied by an explanation of the phenomenon by Prof. Douglass, of the University of Michigan. Prof. Douglass attributes the freezing to the radiation of heat from the extremity of the pipe, and remarks: "The clear water, being to a great extent transcalent, would not interrupt the passage of the caloric." It will be observed that he prefers to express the power of transmitting heat by the word transcalent, from the Latin *trans*, through, and *calor*, heat, instead of the word diathermic, from the Greek, *dia*, through, and *thermos*, hot, employed by Melloni and other writers.

Making, however, no objection to the term, we should like to know whether Professor Douglass has the authority of any later investigations than those of Melloni for the statement that water would not interrupt the passage of the caloric? Melloni found that water prevented the passage of a larger proportion of heat than any other of the liquids that he tested.

The following table of Melloni's results is from Miller's Chemical Physics. The figures give the number of rays that were transmitted by each of the liquids from 100 rays that fell upon them:—

DIATHERMACY OF LIQUIDS CONTAINED IN GLASS—STRATUM OF LIQUID 0·362 INCH. THE SOURCE OF HEAT IN EACH CASE WAS AN ARGAND OIL LAMP.

Bisulphide of Carbon (colorless)	63
Chloride of Sulphur (red brown)	63
Terchloride of Phosphorus	62
Essence of Turpentine	31
Colza Oil (yellow)	30
Olive Oil (greenish)	30
Ether	21
Sulphuric Acid (colorless)	17
do. (brown)	17
Nitric Acid	15
Alcohol	15
Distilled Water	11

The source of the heat in this case was the naked flame of an argand lamp, and water is doubtless more diathermic or transcalent to heat of this high intensity than to heat of lower temperatures—as this is the case with all known substances with the single exception of rock salt. Miller gives, also from Melloni, the following table of the diathermacy of several solids to heat of different temperatures:—

DIATHERMACY OF DIFFERENT SOLIDS.

Each Plate was 0·102 inch thick.	Naked Flame.	Platinum.	Copper 700° F.	Copper 212° F.
Rock salt (limpid)	92·3	92·3	92·3	92·3
Sicilian Sulphur (yellow)	74	77	60	54
Fluor Spar (limpid)	72	69	42	33
Rock Salt (cloudy)	65	65	65	65
Beryl (greenish yellow)	46	38	24	20
Iceland Spar (limpid)	39	28	6	0
Plate Glass	39	24	6	0
Quartz (limpid)	38	23	6	3
Quartz (smoky)	37	28	6	3
White Topaz	33	24	4	0
Sulphate of Barium	24	18	3	0
Tourmaline (dark green)	18	16	3	0
Citric Acid	11	2	0	0
Alum	9	2	0	0
Sugar Candy (limpid)	8	1	0	0
Ice	6	0·5	0	0

It will be observed that while ice transmits six per cent of the heat from a naked flame, it passes but one-half per cent of the heat from red-hot platinum, and none from copper at 750°. As the heat emitted from the Detroit water pipe is of very low temperature, we should suppose that the surrounding water, however clear, would almost, if not entirely, prevent its passage.

TOWN SEWAGE AS MANURE.

At a meeting of the Chemical Society, at London, on the first of February, Dr. Gilbert delivered a very instructive lecture "*On the Composition, Value, and Utilization of Town Sewage*," which was illustrated by a series of tables showing, in detail, the analytical results obtained by himself and previous observers. From these analyses it seems that at English prices of guano, the value of the ammonia in town sewage for manure is about $2 per annum for each individual of the inhabitants. Besides the ammonia, there is some phosphoric acid and potash, which are valuable as manure. Both analysis and practical trials showed that sewage water is of more value for grass land than for wheat. In a three years' trial at Rugby on four grass plats, of an acre and a quarter each, the following weights of green grass were obtained:—

I. Not watered—9 tuns 6 cwt.
II. Sewage 3,000 tuns—22 tuns, 5 cwt.
III. Sewage 6,000 tuns—30 tuns 6 cwt.
IV. Sewage 9,000 tuns—32 tuns, 12 cwt.

The application of sewage meadows at Lochend had raised the average rent to $105 per acre; and at Darry Holes to $155 per acre.

Dr. Gilbert stated, in conclusion, that as the two dollars' worth of sewage per head is diluted in towns by at least 60 tuns of water, to pump it up by artificial means would cost more than it is worth. It can be profitably used only where towns are situated on grounds so high that water from the sewers will flow by gravitation over meadows in the vicinity.

As in this country manure is worth much less than in England, while the cost of raising water by steam is much greater, the idea of utilizing the sewage of New York and other American seaports must be abandoned until the increase in population makes manure more valuable. At all events, it must be understood that the problem now is, to raise and distribute 60 tuns of water at a cost of less than two dollars.

FARMERS' CLUB.

LICE ON CATTLE.

At the last meeting of the Farmer's Club, Mr. Stewart inquired what substance would exterminate lice from the Angora goat without injuring the animal.

Mr. Solon Robinson replied, "Petroleum."

Mr. Stewart said, "We tried petroleum and it killed the lice, but it came very near killing the goat. In a few days all the wool came off, so that we had to blanket the animal."

Mr. Williams stated that he had found mercurial ointment effectual in clearing sheep and cows of lice. It is generally sufficient to saturate a string with the ointment and tie it round the animal's neck, taking care to work it under the wool and hair so that it may come in contact with the skin.

Dr. J. V. C. Smith explained that lice, as well as all similar insects, breathe through holes in the body. These holes are minute spirules constantly kept open by an elastic ring, and surrounded by a fringe of extremely delicate hair which prevents the intrusion of any solid particles. To kill the insect it is only necessary to close these breathing holes, and this is done by smearing them with any kind of grease or oil. You may catch a caterpiller and examine him with a magnifying glass, and you will find these spirules ranged in two rows, one on each side; then, if you take a moth or butterfly, you will find the breathing holes in the body corresponding with those in the body of the caterpillar from which it was produced—the same body, in fact, remaining after the wings are developed. If you dip a feather in oil, and smear the two spirules nearest the tail, the lower portion of the body will be paralyzed, so far as these holes; proceeding upward, and closing the other holes in succession, you may paralyze the whole body till you come to the last two, which are situated just below the jaws. So long as these remain open the insect will continue to breathe, but if these are now closed he dies immediately.

To exterminate lice upon any animal, it is only necessary to cover the animal completely with grease or oil. The simplest and cheapest oil is the best—lard, fish oil, or any other that is at hand.

Mr. Stewart said that he had tried lard and sulphur without success.

Mr. Dodge remarked that the sulphur would make the mixture so stiff that the lard would not come in contact with nearly all the vermin.

TRICKS.—Of all the "smart" instances of Yankee ingenuity perhaps the smartest is the trick played upon the authorities of New Brunswick, after their recent offer of $3 for the snout of every bear killed within the colony. A large number of snouts were recently brought in chiefly by Indians, but in course of time it was discovered that most of the trophies were imitations only, cunningly manufactured of india-rubber and gutta-percha by clever manipulators in the State of Maine, who sold them to the Indians at half a dollar each.

IN order to test the purity of otto of roses, all that is necessary is to mix five drops of the otto with twenty of pure concentrated sulphuric acid. Whether the oil be adulterated or not, a thick, yellowish-brown mixture is the result. When this mixture is cold it is shaken up with three drachms of absolute alcohol. If the otto is pure the solution is clear, and remains so when boiled, but when it is adulterated the solution remains turbid.