

cast-steel, and Bessemer metal of a homogeneous and compact molecular arrangement, as described."—*Newton's London Journal of Arts.*

Matches without Phosphorus.

We had occasion, some months ago, to draw attention to the terrible effect upon the health of the workmen engaged in the manufacture of the phosphorus which enters into the composition of the lucifer matches at present in use, and to mention that Dr. Hierpe, of Stockholm, was engaged in an earnest endeavor to discover some means of producing effective friction matches without the aid of a substance the whole of our supply of which ought to be devoted to the fertilization of the soil, and which, when employed in the arts in the free state, is so frightfully injurious to those who are unfortunate enough to have to manipulate it.

Dr. Hierpe has since patented, both in Sweden and some other continental countries, a composition for the tips of friction matches, consisting of a mixture of four to six parts of chlorate of potash with two parts of bicarbonate of potash, two parts of either peroxide of iron, protoxide of lead, or deutoxide of manganese, and three parts of glue or other cement. Matches tipped with this composition will only ignite when rubbed upon a surface specially prepared. For this igniting surface Dr. Hierpe uses a mixture of twenty parts of sulphide of antimony with two to four parts of bicarbonate of potash, four to six parts of either oxide of iron or oxide of lead, and from two to three parts of glue. The new matches are no more costly than the old ones, and, besides having the advantage of their manufacture being innoxious, and not involving the consumption of any substance which ought not to be spared from other purposes, are immensely safer than our ordinary matches, since they will not ignite except when rubbed upon a composition prepared expressly for the purpose—*Mechanics' Magazine.*

Practical Memoranda.

Weights of Pipes of various Metals, and Diameters.

Thickness in parts of an inch.	Wrought Iron.	Copper.		Lead.	
		lbs.	plata.	lbs.	lead.
$\frac{1}{8}$	326	11 $\frac{1}{2}$	38	2	483
$\frac{1}{10}$	653	23 $\frac{1}{2}$	76	4	967
$\frac{3}{32}$	976	35	1-14	5 $\frac{1}{2}$	1-45
$\frac{1}{4}$	1-3	46 $\frac{1}{2}$	1-52	8	1-933
$\frac{5}{16}$	1-627	58	1-9	9 $\frac{1}{4}$	2-417
$\frac{3}{8}$	1-95	70	2-28	11	2-9
$\frac{7}{16}$	2-277	80 $\frac{1}{2}$	2-66	13	3-383
$\frac{1}{2}$	2-6	93	3-04	15	3-867

Rule. To the interior diameter of the pipe, in inches, add the thickness of the metal; multiply the sum by the decimal numbers opposite the required thickness, and under the metal's name;

also, by the length of the pipe in feet; and the product is the weight of the pipe in lbs.

1. Required the weight of a copper pipe whose interior diameter is $7\frac{1}{2}$ inches, its length $6\frac{1}{2}$ feet, and the metal $\frac{1}{4}$ of an inch in thickness.

$$7.5 + .125 = 7.625 \times 1.52 \times 6.25 = 72.4 \text{ lbs.}$$

2. What is the weight of a leaden pipe $18\frac{1}{2}$ feet in length, 3 inches interior diameter, and the metal $\frac{1}{4}$ of an inch in thickness?

$$3 + .25 = 3.25 \times 3.867 \times 18.5 = 232.5 \text{ lbs.}$$

NOTE.—Weight of a cubic inch of

	equal	4103	lb.
Lead	"	3225	"
Copper, sheet,	"	8037	"
Brass, "	"	279	"
Iron, "	"	263	"
Iron, cast,	"	2636	"
Tin, "	"	26	"
Zinc, "	"	03617	"
Water,	"		

Heating Power of Various Combustible Substances.

Species of Combustible.	Pounds of water which a pound can heat, from 0° to 212°.	Pounds of Boiling water evaporated by 1 Pound.	Weight of Atmospheric air at 32° to burn 1 Pound.
Wood, in its ordinary state..	26	4.72	4.47
Wood charcoal	73	13.37	11.46
Pit coal	60	10.90	9.26
Coke	65	11.81	11.46
Turf	30	5.45	4.60
Turf charcoal	64	11.63	9.86
Carburetted hydrogen.....	76	13.81	14.68
Oil	78	14.18	15.00
Wax			
Tallow			
Alcohol of commerce	52	9.56	11.60

To Estimate Distance.

Observe how many seconds elapse between a flash of lightning and the thunder, and multiply them by 1142, the number of feet sound travels in a second, the product will be the distance in feet. The same process may be applied to the flash and report of a gun, or any other sound, provided we can ascertain the time at which it is produced, and the interval that elapses before it reaches the ear.

Illustration. Saw a flash of lightning five seconds before I heard the thunder: required the distance.

$$\frac{5 \times 1142}{8 \times 1760} = 1\frac{1}{2} \text{ mile distant.}$$

In the absence of a watch, the pulsations at the wrist may be counted as seconds, by deducting one from every seven or eight.

PRECISION.—Precision is a good trait of character. A writer in a late number of an agricultural contemporary says that 24 days, 12 hours, 43 minutes, and about 62 seconds is the turkey's natural time to sit.