

acids and stop the process. Either of the acids will cut iron or steel, but it requires the mixture to take hold of gold or silver. After you wash off the acids, apply a little oil.

Arsenical Soap.

This preparation is used to preserve the skins of birds and other small animals. Take of carbonate of potash 12 oz.; white arsenic, white soap, and slacked lime, of each 4 oz.; powdered camphor, $\frac{1}{2}$ oz. Add sufficient water to form a paste.

Practical Memoranda.

Linear Expansion of Metals.

Of the Linear Dilatation of Solids by Heat. Dimensions which a bar takes at 212°; whose length at 32° is 1·000000.

Cast iron	1·00111111
Steel (rod)	1·00114470
Steel, not tempered	1·00107875
Steel, tempered yellow	1·00136900
Steel, at a higher rate.....	1·00123956
Iron	1·00118203
Soft iron, forged.....	1·00122045
Gold	1·00150000
Copper	1·00191000
Cast brass	1·0018750
Silver	1·0018900
Tin	1·0028400
Lead.....	1·00284836
Zinc	1·00294200
Glass from 32° to 212°	1·00086130
Glass from 212° to 392°	1·00091827
Glass from 392° to 572°	1·00101114

Expansion of Liquids.

Expansion of Liquids in Volume from 32° to 212° Fahrenheit.

10000 parts of water	become	1046
" " oil	"	1080
" " mercury	"	1018
" " spirits of wine	"	1110
" " air	"	1373

Sizes of Nails.

The following table will show any one at a glance the length of the various sizes and the number of nails in a pound; they are rated "3-penny" up to "20-penny." The first column gives the name, the second the length in inches and the third the number per pound:—

3-penny.	1 inch.	557 nails per lb.
4. "	1 $\frac{1}{4}$ "	353 " "
5. "	1 $\frac{1}{2}$ "	232 " "
6. "	2 "	167 " "
7. "	2 $\frac{1}{4}$ "	141 " "
8. "	2 $\frac{1}{2}$ "	101 " "
10. "	2 $\frac{3}{4}$ "	98 " "
12. "	3 "	54 " "
20. "	3 $\frac{1}{2}$ "	34 " "
Spikes	4 "	16 " "
"	4 $\frac{1}{2}$ "	12 " "
"	5 "	10 " "
"	6 "	7 " "
"	7 "	5 " "

From this table an estimate of quantity and suitable sizes for any job can be easily made.

Glass-engraving Ink.

M. Kessler's successful experiments in engraving flint glass by means of alkaline fluorides and acids led to the preparation of an ink from hydrofluoric acid of ammonia and hydrochloric acid, with which characters and designs may be written ineffaceably upon glass.

Anaesthesia applied to Horses.

Horses are beginning to receive the benefit of anaesthesia in surgical operations. It has been applied with success locally, both by means of ether, and of the rhigolene spray. Many horses may thus be saved by operations which otherwise would be impossible or fruitless.

How to cleanse a Cistern.

A simple thing I have accidentally learned, and if not generally known, ought to be, relating to stagnant odorous water in cisterns. Many persons know how annoying this sometimes becomes. After frequent cleaning and other experiments, all to no permanent utility, I was advised to put, say, two pounds caustic soda in the water, and it purified it in a few hours. Since then when I tried what is called concentrated lye I had quite a good result. One or both of these articles can be obtained at any druggist's.—*Exchange.*

Friction of Metals.

The friction of iron journals in brass boxes, with a film of good oil interposed, has been found in some cases to be as little as 1·60th of the weight. Ordinarily it is about 1·30th of the weight, while if the surfaces are wiped dry from oil it is about 1·10th.

The friction of metals upon each other becomes a larger proportion of the pressure as the pressure is increased. The friction of wrought-iron on wrought-iron, at a pressure of 32 $\frac{1}{2}$ lbs. per square inch, was found by Mr. G. Rennie to be $\frac{1}{4}$ of the pressure. At 4 $\frac{1}{2}$ cwt. per square inch it was $\frac{1}{400}$ of the pressure.—*Engineering.*

Fastening for Belts.

Two thin metal plates, their inner faces roughened like those of a vise, and held together by screws, form a cheap, strong, and convenient fastening for driving-straps. If the strap stretch, the screws (which pass between the ends of and not through the strap) have only to be loosened, the ends of the leather cut shorter, and clamped anew.—*Ibid.*

To protect Trees from Insects.

A correspondent of *The Country Gentleman* asserts that red cedar twigs bound around the bodies of fruit trees, butts upward, will effectually protect the trees from insects. And if fruit trees, why not shade trees? Col. Dewey, of Hartford, writes to *The Horticulturist* that, in his vineyard, grapes twined upon red cedar posts and trellices are free from mildew and insects, and those growing closest to the posts have the most healthful appearance and are the most productive.