The following are stated to be the results of tests which have been applied to this cable:—

The cable when covered with cane alone—weight, $\frac{3}{4}$ ton. Breaking strain, $2\frac{1}{2}$ to 3 tons.

When combined with steel wire—weight not exceeding $1\frac{1}{4}$ ton. Breaking strain, from 4 to 5 tons.

When constructed in this latter manner, the sinking or dead weight of the steel wire is compensated for by the floating power of the cane, and the cable would descend in a horizontal position to the ocean bed slowly and without strain, and capable of spanning any sub-oceanic valley three or four miles in width, without risk of breaking.

Diameter, in every instance, within an inch.

Method of Preserving Fruit Trees from Frost.

In the month of February, while the ground is still frozen, a rather thick coat of cold manure is spread around the roots of the trees. This is allowed to remain until all danger of frost is past. It prevents the thawing of the ground and checks the budding of the trees, but so soon as the manure is removed they bud and flower rapidly.—*Dingler's Polytechnisches Journal*.

Desulphuration of Iron in Puddling.

Prof. Richter, of Leoben, Styria, recommends the oxide of lead (litharge) for this purpose; and in an experiment in which 4 lbs of litharge were added to 865 lbs. of iron, 4 lbs. of sulphuret, and $\frac{3}{8}$ lb. of phosphuret of iron, the results were wholly satisfactory, the iron being entirely soft and malleable. The operation was moreover finished in much less then the ordinary time.—*Dingler's Polytechnisches Journal*.

For the Journal of the Franklin Institute.

Stability of Vessels in Water. By JOHN W. NYSTROM.

This subject is discussed in almost every work on ship-building, but in most cases so complicated that it requires a scientific man to understand it. I have frequently been consulted on the subject, and considering its great importance in the new era of naval architecture, have written this article, which I have endeavored to make as simple and practical as possible. I will not here enter into any proofs of the formulas, which would render the article too long and tedious, but will only give the conclusive substance which bears directly on practice.

In constructing iron-clad vessels, it is difficult to bring down the centre of gravity low enough to make a good sea-going vessel, where the momentum of stability must be in a safe proportion to its sailing momentum.

Fig 1

$$b = \frac{D B^3 \tan. v}{772^* L M^2} \quad . \quad . \quad . \quad 1.$$

$$w l = D (b \pm a \sin. v). \quad . \quad . \quad . \quad 2.$$

$$\text{Metacentre } m = b \cot. v. \quad . \quad . \quad . \quad 3.$$

$$\text{Depth } \delta = d \cos. \frac{1}{2} v. \quad . \quad . \quad . \quad 4.$$

Fig 2

$$\pm a = \frac{1}{\sin. v} \left(\frac{w l}{D} - b \right). \quad . \quad . \quad . \quad 5.$$

$$l = \sin. v (h - r \sin. v) + r \sec. v + b. \quad 6.$$

$$\cot. v = \frac{D}{w l} \left(\frac{D B^3}{772^* L M^2} \pm a \right). \quad . \quad . \quad 7.$$

$$\text{Capsizes when } a \sin. v = \text{or } > b. \quad . \quad . \quad 8.$$

Fig 3

$$\text{Caren force } W = f A \sin. z \cos. u. \quad . \quad . \quad 9.$$

$$\text{Sailing force } F = f A \sin. z \sin. u. \quad . \quad . \quad 10.$$

$$\text{Miles per hour } M = \sqrt{\frac{F}{6 M^2}}. \quad . \quad . \quad 11.$$

$$\text{Force of wind } f = \frac{4 M^2}{A \sin. z \sin. u}. \quad . \quad . \quad 12.$$

* 772 for salt and 750 for fresh water.