TO TELL IRON FROM STEEL, IN SMALL PIECES.

Translated from Dingler's *Polytechnisches Journal*. By W. F. WORTHINGTON, U. S. N.

A new fracture ordinarily furnishes the means for classifying test pieces, but its appearance is not a sufficiently safe guide in dealing with good, fine-grained iron or very soft steel.

In order to effect the separation with ease and certainty in such cases, Walrand has given a simple method, page 531, "Proceedings of the Société des Ingénieurs Civils," Paris, 1883. It is by observing the fracture of the test piece after heating and allowing it to take a blue color.

The trial can be conducted in the following manner:

Take a test piece about twenty-five or thirty centimeters long and make a slight scratch about four or five centimeters from the end. Then heat one end slowly and uniformly to a dark red color (325° to 400°C.), and cool it in water. During the cooling, while the piece is still warm, it must be rubbed with a file from time to time, until the shining metallic surface laid bare, has assumed a dark yellow, or better, a blue color, when it is to be cooled quickly and completely.

The fractures of the piece broken at the mark, serve for comparison. Ordinary wrought-iron broken when cold appears fibrous or crystalline; but treated as above, its fracture is dull, irregular, and of short fibre. Hard and moderately hard steel are fine grained; after the heating and subsequent treatment, they have a shining, totally or partially, smooth fracture. Swedish iron has only traces of fibres and is hardly to be told from soft steel; after treatment, the fibres become distinct, the smooth appearance is lost, and the iron becomes so much the more distinguishable from soft steel treated in the same manner.

MARSAUT'S SAFETY LAMP.—Museler's lamp has been hitherto thought to be perfectly safe in any explosive mixture of gases where there are no currents, but recent experiments seem to show that an explosion can be produced in from 1 to 5 times per hundred. This discovery explains the accident at Champagnac. Marsaut has accordingly added a second sieve within the horizontal diaphragm, and his new model has resisted more than 6,000 trials, under conditions in which all other forms have been found defective.—*Soc. des Ing. Siv.*, April, 1883. C.