

**NOTES FROM THE RESEARCH LABORATORY
WESTINGHOUSE ELECTRIC AND
MANUFACTURING COMPANY.***

**AUTOGRAPHIC MEASUREMENTS OF THE QUENCHING
POWER OF LIQUIDS.**

By Norman B. Pilling.

[ABSTRACT.]

THE method which has been followed in this work involved the measurement of the rate of cooling of a small metallic cylinder quenched from a certain fixed temperature in the desired quenching medium, the latter being maintained at various temperatures. The temperature within the cylinder was measured with a small insulated platinum thermocouple, the hot junction of which was in good thermal contact with the bottom of an axial hole in the cylinder; the initial temperature of quenching was measured with a potentiometer, and subsequent temperature changes taking place during quenching were measured with a calibrated Enithoven galvanometer and recorded photographically upon a rotating film. Time intervals were also impressed upon the photographic record through suitable connections with a seconds pendulum.

It was not found feasible to use a steel cylinder for a heat reservoir, as the quantity of heat liberated at the transformation temperature was both variable and great enough to mask the temperature changes due to heat abstraction by the quenching liquid alone. An alloy composed of nickel with 5 per cent. silicon met the requirements suitably and had the additional advantage of being extremely resistant to oxidation, thus permitting the same standard to be used repeatedly, avoiding uncertain conditions due to small variations in mass and position of the thermo-element. The standard cylinder was 50 mm. long, 6 mm. diameter and weighed 11.6 grams.

A number of oils and aqueous solutions have been examined through a considerable range of temperature, and the results indicate the comparative stability of quenching power maintained

* Communicated by the Engineer in charge.

by oils at elevated temperatures as compared with the profound effect which temperature has with aqueous solutions in general upon their ability to absorb heat rapidly, due to changes in the mechanism of heat absorption. As an example, the ratio of the quenching power of water at the freezing point to that at the boiling point, taking the quenching power as proportional to the cooling velocity of the standard cylinder at 700°C. , is 1:20.

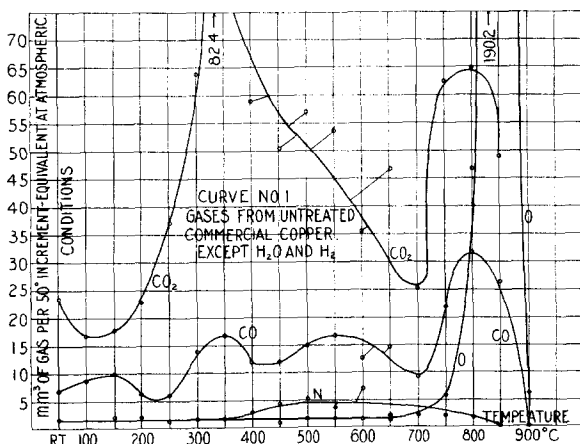
A more extended report on this subject will be published shortly elsewhere.

GASES FROM COPPER.

By H. M. Ryder.

[ABSTRACT.]

IN the course of some work concerning certain of the physical properties of copper, it was necessary to determine gases which could be removed from copper upon heating in vacuum. The



copper here used was annealed rolled strap containing .05 per cent. Cu₂ and .025 cm. x .244 cm. x 214 cm. long. This weighed 5 grams approximately and its volume was 1.31 c.c. This was placed in an apparatus developed for this work,¹ and was heated by the passage of an electric current, its temperature being determined by resistance changes. The gas removed was collected, out of contact with the copper, for 12 hour periods, the temperature of

¹ *J. Am. Chem. Soc.*, x1, 1656, Nov., 1918.