Note on the Determination of Vapor Densities.

By Chas. T. Knipp

The object of this note is to describe briefly a method of determining vapor densities which was suggested to the writer last year while making observations on the surface tension of water at high temperatures.

The principle used is that the buoyancy of vapor increases as the density increases. An iron core *mn* (Fig. I), carrying a sphere *S* at its lower end is lifted by the sucking action of a coil in which a current is flowing. The lifting coil and core with sphere attached are contained in a steel vessel of sufficient strength to withstand high pressures. Three insulated circuits are run through the plug closing the vessel. The scheme

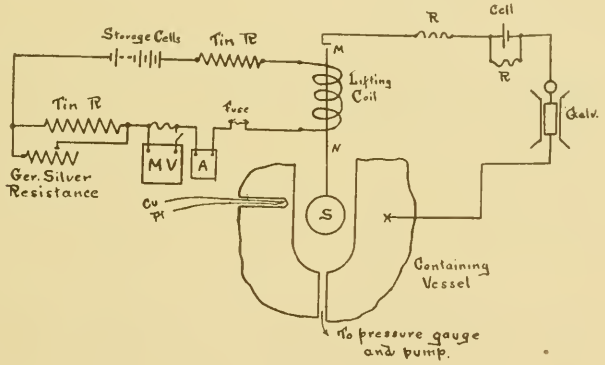

Fig. I.

of connections is shown in Fig. I. The lifting current is supplied by a number of storage cells, the current being adjusted by tin resistances until the sphere is lifted. At that instant contact is made at *M*, closing the signal circuit, shown to the right in the figure. The temperature is read by means of a Cu-Pt thermo-junction. This is placed in a hole drilled in the containing vessel to within 2mm of the inner cavity. The vessel communicates with a pressure gauge and pump. The current required to lift the sphere is read by means of a milli-volt meter looped around a .03-ohm coil.

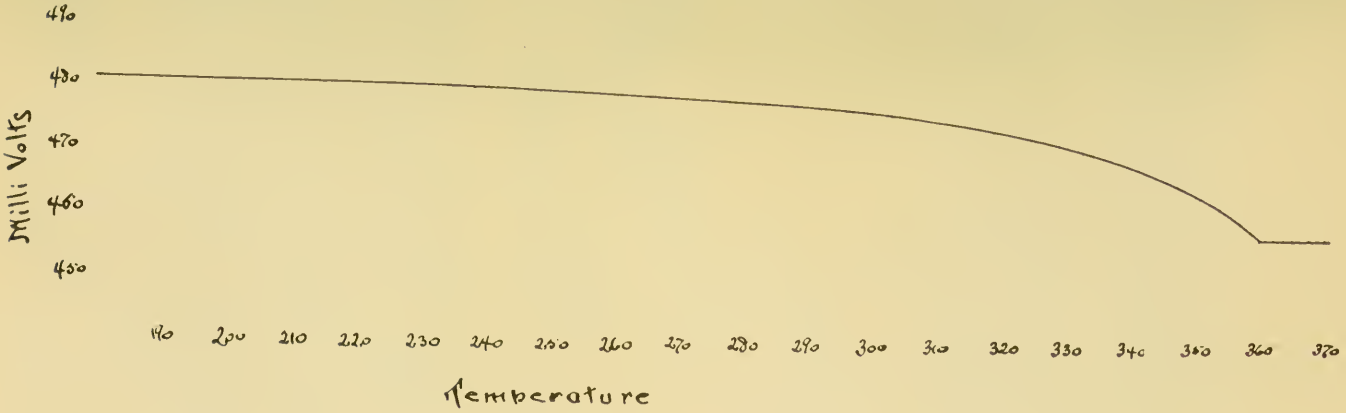
Milli Volts
490
480
470
460
450
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
360
370
Temperature

Fig. 2.

As yet only a few readings have been made, and these were obtained incidentally while conducting the investigation referred to above. A curve was platted (Fig. 2) in which temperatures are abscissas, and the corresponding currents are ordinates. Only the upper portion of the curve is shown in the figure. The density increases very slowly at first, and becomes constant when the critical temperature is passed.

This method furnishes a means of determining the critical temperature and critical pressure, as well as the critical volume of a liquid.

An Improved Wehnelt Interrupter.

[Abstract]

By Arthur L. Foley and R. E. Nyswander.

The chief difficulties encountered in working with the ordinary type of Wehnelt Interrupter are that the glass tube which holds the platinum wire is continually breaking and that the length and size of the projecting platinum wire can be changed only by constructing new tubes.

In the improved interrupter a lead vessel serves as electrode and to contain the electrolyte. The platinum wire is held in a brass tube having its lower end slotted and conical. A collar, sliding on the conical end, serves to press the jaws together and to clamp the platinum wire. The projecting end of the wire may be about 1 cm. long; the remainder of the wire may extend up the inside of the tube.

The lead vessel should be filled half full of the electrolyte and over this should be poured a layer of coal oil 2 or 3 cm. deep. The brass tube is gradually lowered until the platinum point extends to the desired depth in the electrolyte. The remainder of the platinum wire and the brass tube are entirely protected by the oil. The oil serves also to decrease the spray and fumes from the electrolyte. A platinum loop instead of a point is preferable in many cases. The action of the interrupter is made more constant.

Many other electrolytes may be used besides the usual 10 per cent. solution of sulphuric acid and water. As a matter of fact for high or low voltages some other electrolytes are superior. The following tables gives some data concerning a few of many electrolytes that have been used with this form of interrupter: