XVII.—*A New Apparatus for the Determination of Melting Points.*

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As it is well known that the behaviour of liquids in capillary tubes is controlled by laws different from those which regulate them under ordinary conditions, it is obvious that the usual method of determining melting points is consequently open to at least one serious objection; and as the ascertaining of the exact melting point of a substance thereby is a matter of some little difficulty and trouble, a method which is not open to such objections must be regarded as a desideratum. We believe that the following method will recommend itself on this account.

The essential parts of the apparatus consist of a small platform, Fig. I (actual size), made of very thin sheet-iron (the thin sheets used for ferrotypes are suitable) or silver (platinised), having an opening A, cut for the purpose of receiving the bulb of a thermometer, and a small indentation B, about 1.5 mm. deep and 2 mm. in diameter, and a glass float (Fig. II) having a thin piece of platinum wire sealed into one end, flattened, and bent in the shape of the letter L, as shown.

To make an observation, a very small quantity of the substance is melted in the indentation (B, Fig. I) of the platform, and while it is still liquid, the platinum wire of the float is placed in it, and allowed to become fixed by the solidification of the substance. Thus arranged, a thermometer is placed in the opening A, and the whole disposed as in Fig. III in a small beaker containing mercury (or other liquid). The mercury is now gently heated, the thermometer being carefully

FIG. I.

FIG. II.

FIG. III.

watched. As soon as the melting point is reached, the float, being liberated, rises instantly to the top of the mercury.

The special advantages of this method, in addition to those already alluded to, are these:—(I) The substance being entirely surrounded by the mercury and the metallic platform is certain to be of exactly the same temperature as the thermometer; (II) on account of the perfect conductivity of the mercury no stirring is necessary; and (III) as the sudden rise of the float at the melting point forces itself upon the attention of the operator, his observations can be entirely confined to the thermometer.

The following determinations may be cited as showing the correctness of the method and its applicability to a very wide range of temperature. The numbers have a purely relative value, as the thermometer was not corrected in any way, nor were the substances specially purified:—

Purified paraffin.	Resorcinol.	Mercuric chloride.	Sodium nitrate.
52.7°	105.0°	257.0°	286.0°
52.4	105.1	259.0	287.0
52.4	105.0	259.0	287.0
52.6	105.5	—	288.0
52.7	104.5	Mean 258.3	286.0
52.3	105.0		—
Mean 52.5	105.0		Mean 286.8

In order to prove the correctness of the method, the melting point of the paraffin used in the above determinations was observed by the inverse method of immersion of the thermometer in a half melted mass, as in the determination of the melting point of ice. In three experiments the values 52.5, 52.4, and 52.5 were obtained.

Notes.

(a.) In order to prove that no stirring was necessary, the following experiment was made:—A test-tube, 3 ins. in diameter and 8 ins. long, was filled with mercury and fitted with two thermometers, the bulb of one being at the top and that of the other at the bottom of the mercury. On gently heating it was found that both thermometers indicated exactly the same temperature. This being so, if very accurate results were required, the *thermometer* could be immersed in the mercury to any extent, and thus the error due to the exposure of the stem could be eliminated.

(b.) Since writing the above, we have seen a notice of a melting point apparatus described by C. H. Wolff (*Arch. Pharm.* [3], 6, 534). His arrangement, which is a modification of one proposed by G. Löwe, consists in coating a thin platinum wire with the substance whose melting point is to be observed, and making it part of an

electrical circuit in which a bell is placed. The connection between the two is made by a mercury-bath containing a thermometer. If now the bath be heated the substance melts, and the platinum wire becomes electrically connected with the bell, and thus the melting point is announced.