NOTES

A Convenient Thermostat Heater.—A dependable thermostat heater that does not emit any light, that is perfectly insulated from the bath and that does not corrode and render the water turbid, became necessary in the work of the author. The usual lamps and metallic heating coils failed to meet one or more of these requirements. A capillary thread of mercury worked very successfully on an A. C. line stepped down by a toy transformer, but it was found impractical to make a mercury resistance high enough to go across a 110-volt D. C. line directly. Accordingly, a new heater had to be developed.

The following device met all these needs very satisfactorily. A Pyrex tube about 40 cm. long and 3 mm. bore was bent into a U and filled with fine flake graphite packed tightly by tapping. Contact was made by means of pieces of copper rod, the ends of which were turned down to conical points to increase the area of contact with the graphite and which were held in place by means of spring leads from the binding posts as indicated (see Fig. 1). A heater of these approximate dimensions, now in use, was found to have a resistance of 270 ohms and accordingly has a heating capacity of 45 watts when put on the 110-volt line. On testing the regulation with a Beckmann thermometer, the heater was found to go on and off regularly in an interval of $0.012°$. It would be difficult to distribute this lag

Fig. 1.

between the lag of the heater, the stirring, or the sensitivity of the mercury regulator used. In any case, as this degree of regulation was quite ample for the work in hand, no attempt was made to improve it.

This graphite heater is easily made, has given excellent service under the conditions indicated above, and should find application wherever a heater fulfilling these requirements is desirable.

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The Computation of Partial Molal Quantities of Binary Solutions.—The method here developed will be particularly useful in those cases in which great accuracy is desired. For a general discussion of partial molal quantities and methods of their calculation the reader is referred to the work of Lewis and Randall.[1]

[1] Lewis and Randall, "Thermodynamics and the Free Energy of Chemical Substances," McGraw-Hill Book Co., New York, 1923.