present in the coke. The effects of very slow percolation, such as is practiced when auricyanides are to be removed from solution by charcoal, is a question outside the scope of the present inquiry.

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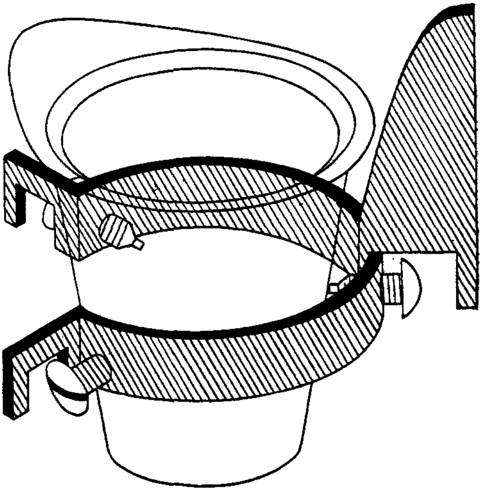
NOTE.

A Substitute for Forceps and for Triangles in Desiccators; An Article for General Laboratory Use.—It is possible to make, at small cost, a device combining the essential features of the more expensive platinum forceps and triangles and presenting advantages by virtue of which the manipulation of crucibles becomes at once easier and more certain, as less handling is necessary. Moreover, in transferring, the cover is never removed so that errors incident to that procedure are eliminated. When not in use as a transferring agent, the device remains in the desiccator and thus comes in contact with no undesirable foreign matter. The accompanying sketch shows a crucible in the holder.



A convenient size may be made from a strip of brass 9 mm. wide, 1.8 mm. thick, 140 mm. long, bent into the form of a ring with a consequent diameter of 45 mm. The same end may be attained more easily by the use of brass tubing of the proper dimensions. The free ends, which are to serve as two of the supports, are bent outward at right angles to the periphery, leaving an opening sufficiently wide to admit easily the more common sizes of crucibles. A handle of brass is riveted or soldered on the ring opposite the opening and extended in such a manner that a third support is formed. The lower edges of the three supports lie in the same plane. Three adjustable brass screws, 120° apart, pass through the ring near the lower edge, directed toward its center, one screw being immediately under the handle. The tips of the screws are bored to admit very short pieces of platinum wire, 1 mm. in diameter, and are then compressed to hold the latter in place. The device weighs approximately 25 grams.

As a substitute for the platinum triangle, the holder may be used in any form of desiccator. In the dome-shaped form, the three supports rest on the brass rim; in the commonly used Scheibler pattern, the notches in the under side of the supports bear on a frame of glass rod, similar to that generally used for the platinum triangle, and thus danger of lateral displacement is avoided.

To use the device, one adjusts the screws to impinge on the upper part of the crucible. The latter is thus held firmly but may be released when desired by lowering and withdrawing the holder.

Messrs. Eimer and Amend have taken up the manufacture of the article, which is obtainable at a moderate price. C. W. EASLEY.

CLARK COLLEGE, WORCESTER, MASS.

[FROM THE LABORATORY OF BIOCHEMISTRY AND PHARMACOLOGY, UNIVERSITY OF CHICAGO.]

THE MECHANISM OF THE OXIDATION OF GLUCOSE BY BROMINE IN NEUTRAL AND ACID SOLUTIONS.

BY H. H. BUNZEL AND A. P. MATHEWS.

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I. Introduction.—Glucose is known to be both an acid and a base. At least one of its hydrogens may be replaced by a metal to form a salt. Kullgren[1] states that the dissociation constant of invert sugar is 7.2×10^{-13} and cane sugar, 1.05×10^{-13} at 21°. Osaka[2] has computed the dissociation constant of glucose to be 5.9×10^{-13} at 25°. Glucose is, therefore, a very weak acid and its dissociation as an acid will be diminished by small amounts of strong acids.

The work of Baeyer and Villiger,[3] Cohn,[4] Walden,[5] Walker[6] and others on oxonium salts and the work particularly of Stieglitz[7] on the inversion of the imido esters and cane sugar shows that glucose is also a weak base uniting with acids in its double bonded oxygen of the aldehyde group. As a base it is extremely weak so that even in solutions containing a considerable amount of strong acid there will still be a large amount of hydrolytic dissociation, only a small amount of the glucose salt being present.

We have, therefore, in a neutral or acid solution of glucose the following kinds of glucose particles: $C_6H_{12}O_6$ undissociated; $C_6H_{12}O_6.H_2O$, the free base; $C_6H_{11}O_6^-$; and $C_6H_{13}O_6^+$. These are formed according to the following reactions:

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[1] Kullgren, *Z. physik. Chem.*, **41**, 407 (1902).

[2] Osaka, *Z. physik. Chem.*, **35**, 661 (1900); Cohen, *Ibid*, **37**, 69 (1901).

[3] Bayer u. Villiger, *Ber.*, **35**, 1189 and 3013, (1902); **34**, 2679 and 3612 (1901).

[4] Cohn, *Ibid.*, **35**, 2673 (1902).

[5] Walden, *Ibid.*, **34**, 4185 (1901).

[6] Walker, *Ibid.*, **34**, 4115 (1901).

[7] Stieglitz, *Amer. Chem. J.*, **39**, 29 and 166 (1908).