Effect of the Presence of Lead Salts.

This element may separate in large amounts with the copper from solutions containing sulphuric acid. A large concentration of nitrate ions prevents this, but the amount needed is in excess of that which is desirable, if iron is also present in large amounts. As most of the lead present as ore is usually changed into the sulphate, in preparing the solution, it is preferable to use sufficient care to separate it as completely as possible in this form. We find that, if the insoluble precipitate of the sulphate is left in contact with the solution, very large amounts may be dissolved and precipitated as the deposition progresses.

Practical Application to the Analysis of Ores.

The data presented in the previous sections indicate the difficulties to be avoided in applying the electrolytic method to the analysis of pyritiferous ores. If one-gram samples of such ores are used the resulting solutions may possibly contain 0.2 g. of copper, 0.4 g. of iron and variable amounts of zinc, arsenic and lead.

Assuming first that arsenic is not present and that lead has been carefully removed as sulphate, it should be possible to separate all the copper by the use of the Winkler electrode and a current of 0.75 ampere within ninety minutes, provided the volume does not exceed 100 cc. and the solution does not contain more than five cc. of concentrated sulphuric and no nitric acid. To test the suggestion, a series of solutions containing 0.1956 g. of copper and 0.4 g. of ferric iron were electrolyzed under the conditions named, using the gauze electrode F. The results obtained were:

0.1957 0.1957 0.1958

Assuming that arsenic is also present, either the solution should be electrolyzed under the conditions named above, the deposit dissolved in nitric acid and re-electrolyzed; or, where the amount is small, good results might be expected from a single precipitation by adding to the solution from one to two cc. of nitric acid and 5 g. of urea. To test this suggestion, a series of solutions containing 0.1956 g. of copper and 0.4 g. of ferric iron and 0.01 g. of arsenic (added in the form of H_3AsO_4) were electrolyzed as before, after the addition of one cc. of nitric acid and 5 g. of urea. The results obtained were:

0.1959 0.1948 0.1957 0.1959

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NOTE.

New Normal Solution and Reagent Bottle.—The new normal solution bottle which I have designed is the simplest and most effective of any that has come under my notice. The bottle is of the long narrow type, having a ground-glass cap. The cap and bottle are each provided with a groove which, when turned to coincide, allows the free entrance of air, while when turned in any other position forms an air-tight seal.

Into the bottle are drilled two small holes, one at the upper portion, the other near the bottom. A burette is procured whose delivery tube is bent at two right angles (or an ordinary burette which has been bent into this form). At the base of this burette an opening is blown, right in line with the graduated tube. To this opening a piece of glass tubing which is provided with a glass stopcock, and also has been bent at right angles, is fused. To the top of the burette another piece of glass tubing which has also been bent at right angles, is fused. The two ends which are now at right angles with the burette, and pointing in directly opposite direction from the delivery tube, are placed in their respective holes in the bottle and fused.

The support for the bottle is a light wooden frame, which in turn is suspended between two triangular racks by trunions, which allow the bottle free motion backward and forward. The bottles are never removed from these frames. When refilling is necessary the frame is lifted from its bearings and when the bottle is filled the frame is set back into position. On the base of each stand, between the triangular supports, a piece of white tile is fitted on which the titration is performed.

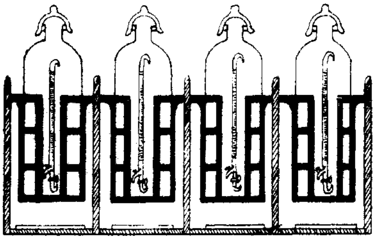

FIG. 1.

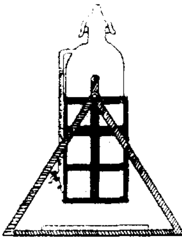

FIG. 2.

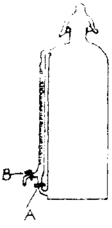

FIG. 3.

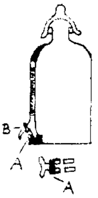

FIG. 4.

In order to manipulate the bottle stopcock *A* (Fig. 3) is opened, stopcock *B* closed, the grooves in the cap and neck are brought to coincide, the bottle is then grasped by the neck and tilted forward, which allows the solution to flow up into the burette. Stopcock *A* is then closed while the bottle is still in its inclined position, preventing the solution from passing from the burette back into the bottle, the bottle is then allowed to regain its original upright position, and the burette is ready for operation. These bottles are arranged in series, as shown in Fig. 1, which is very convenient and requires very little space.

The new reagent bottle, as shown in Fig. 4, is constructed in the same manner as the normal solution bottle, excepting that the burette is part of the bottle and stopcock *A* is set into the bottle, allowing the bottle to be handled as any ordinary reagent bottle, as well as supplying a long-felt necessity, that of knowing the amount of reagent one is using either in qualitative or quantitative work, without going to the necessary trouble of using cylinders, pipettes, etc. One is also positive that no other reagent or dirt of any kind has come in contact with the measuring apparatus.

This bottle is manipulated in the same manner as the normal solution bottle, only held in the hand instead of a support. FRANK M. DAVIS.

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[CONTRIBUTIONS FROM THE SHEFFIELD LABORATORY OF YALE UNIVERSITY.]

METATHETICAL REACTIONS: ETHER-THIOUREAS AND THEIR RELATION TO PSEUDOAMMONIUM BASES.

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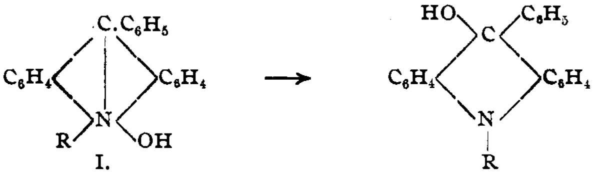
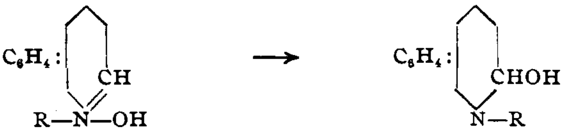
Contents.

I. Pseudoammonium Bases and Their Alcoholates.

A characteristic feature of cyclic, quaternary bases (ammonium bases) is their tendency to undergo isomerization in aqueous solution. The hydroxyl group of the base migrates from nitrogen to a carbon atom, giving trivalent-nitrogen compounds or pseudoammonium bases (*ψ-ammonium bases*).[2] Decker calls these rearrangement products *oxydihydro* or *carbinol* bases.[3] These transformations in the acridine (I), quinoline (II) and isoquinoline (III) series are represented by the following formulas:



I. IV.



II. V.

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[1] Presented at the San Francisco meeting of the American Chemical Society.

[2] Hantzsch and Kalb, *Ber.*, **32**, 575, 3109.

[3] *Ber.*, **25**, 3327.