Where a heavy process is necessary, care should be exercised to avoid the use of an excess of flux or the use of low-grade solder or tin plate which would tend to increase the amount of heavy metals taken up by the goods. Also the length of the process, in order to avoid evolution of hydrogen sulphide, should be as short as possible, consistent with complete sterilization of the goods.

National Canners' Laboratory,
Aspinwall, Pa.

NOTES.

Note on the Insolubility of Ferric Hydroxide in Ammoniacal Solutions.—Some years ago difficulty was experienced in this laboratory from the very considerable solubility of ferric hydroxide in an excess of commercial ammonia. It was found, however, that if, after precipitation, the excess of ammonia was expelled by heating upon a steam-bath, the iron was precipitated quantitatively. No experiments were performed at the time to determine the nature of the substance which caused the difficulty, but since it was assumed that similar impurities were likely to be contained by any commercial ammonia, the precaution of precipitating iron with the smallest possible excess of ammonia and of expelling the greater part of this slight excess upon a steam-bath before filtration, has been rigorously followed since the time when the difficulty was first encountered.

The experiments described below were directed to determine, if possible, the extent of this solubility as well as its cause. Solutions of ferric chloride containing about 0.25 gram of iron were precipitated with redistilled laboratory ammonia. In different experiments both hot and cold solutions of the ferric salt were employed, and both a large and a small excess of ammonia. In every case filtration, without suction, was carried out immediately after precipitation. It was considered unnecessary to wash the precipitate. The filtrates were evaporated to small bulk and were then tested for the presence of ferric iron by adding hydrochloric acid (free from iron) and potassium sulphocyanate. Although in every case an extremely slight yellow color was produced, by comparison with standard tubes containing known quantities of iron it was determined that the amount of iron in the filtrate was never as much as one one-hundredth of a milligram.

A repetition of these experiments with commercial ammonia which had not been redistilled gave similar results.

Since it was probable that an excessive amount of amines in the ammonia might influence the solubility of the ferric hydroxide, further experiments were performed in which there was added to the ammonia before precipitation from 1 to 3 grams of the hydrochloride of an amine. The hydrochlorides used were those of methylamine, ethylamine, diethylamine, isoamylamine, ethylenediamine, aniline and phenylhydrazine. As before, in different experiments with the same amine, precipitation was carried out both in hot and in cold solution, and with large quantities of ammonia as well as with a small excess. The filtrates were evaporated to small bulk and tested for ferric iron. In a few cases the filtrate was slightly yellow after evaporation, owing to organic matter, but in these cases the greater part of the color was removed by heating with a considerable quantity of iron-free nitric acid. In the experiments with aniline and phenylhydrazine the oxidizing effect of ferric iron was avoided by nearly neutralizing the ferric solution with ammonia before the addition of the hydrochloride.

The largest quantity of iron found in any one of these filtrates was five one-hundredths of a milligram and in most cases the amount did not exceed one one-hundredth of a milligram. A quantity of precipitate as small as this might well have been mechanically dragged through the filter-paper. At all events the error introduced by the use of an excess of ammonia in precipitating ferric hydroxide is much smaller than the other errors incidental to a quantitative filtration, and the expulsion of the excess of ammonia, at the risk of solution of a portion of the precipitate through hydrolysis of the ammonium salts, should be omitted.

Evidently the solubility of ferric hydroxide in ammonia which was previously observed was caused by the presence of some organic impurity of unusual occurrence in ammonia.

GREGORY PAUL BAXTER AND ROBERT ARNOLD HUBBARD.

HARVARD UNIVERSITY, CAMBRIDGE, MASS.
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A New Qualitative Test for Calcium.—The difficulty of testing for calcium in the presence of barium and strontium, led the