The butters which gave these last three figures I at first blush suspected of being adulterated with some foreign fat, but subsequent tests showed this not to be the case. The three butters in question were all samples of winter butter, the one giving the figure 11.2 having been kept so long that it was on the verge of becoming tallowy, while the other two were decidedly rancid.

Although the above were samples of unadulterated butter, I, nevertheless, refused to pass them on the strength of the Reichert figure alone, as they were so far below the standard usually accepted by chemists.

Reichert found true butters to give numbers ranging from 13.55 to 14.55, with an average of 14, and declared any butter giving less than 12 must be adulterated.

Dr. G. C. Caldwell reported to the N. Y. State Board of Health estimations of twenty-seven samples of butter, yielding Reichert figures running from 12.7 to 15.5.

Waller and Martin (Report N. Y. State Dairy Commission, 1886) obtained from twenty-six samples of American butters Reichert figures of 12.2 to 16.3.

Prof. C. B. Cochran, West Chester, Pa., Food Inspector of the Pa. Board of Agriculture, has found the extreme minimum of the Reichert numbers of known genuine butters to be 12.5, and this chemist holds that the proper minimum is 11.5.

From the above it will be seen that there is a divergence of views as to what properly constitutes the lowest allowable Reichert figure for butters of known genuineness, but, from my own experience, I am in favor of placing the limit at 11.5.

I do not consider that it would be prudent to go much below this, so as to cover such extreme cases as I have just mentioned, as in cases of this kind it would not do to rely upon the Reichert number alone, the chemist only consenting to pass upon such products after satisfying himself as to their purity, by submitting them to a thorough examination. JAMES H. STEBBINS, JR.

Analysis of Zinc for Cadmium and Lead.—Place fifty grams zinc in a large beaker with 700–800 cc. water and 120 cc. hydrochloric acid (1.20 sp. gr.) and allow to stand over night. The greater portion of zinc is dissolved and removed by decantation. The lead and cadmium are precipitated on residual zinc.

After solution of the lead, cadmium, and residual zinc in dilute

nitric acid, sulphuric acid is added and nitric acid evaporated off. The lead and cadmium sulphates are boiled with water to dissolve cadmium sulphate, and after cooling, lead sulphate is filtered off and determined in the usual manner.

The cadmium in the filtrate is precipitated by hydrogen sulphide and after precipitation, the filter containing the precipitate is placed in a flask and cadmium sulphide dissolved in hydrochloric acid. After driving off the hydrogen sulphide by boiling, fifty cc. of a solution of zinc chloride containing ten grams zinc per liter is added, and cadmium and zinc titrated together with potassium ferrocyanide solution containing 36.76 grams potassium ferrocyanide per liter.

The ferrocyanide solution is standardized by titrating 50 cc. of the zinc solution, the difference between the amount required for the zinc solution and the solution containing cadmium and zinc is the amount required for cadmium precipitation. Each cc. of the ferrocyanide solution should precipitate 0.01 gram cadmium or 0.0085 gram zinc, zinc requiring 4.328 grams potassium ferrocyanide to precipitate one gram zinc.

The titration of small quantities of cadmium without addition of either zinc or more cadmium is inaccurate.

TITRATION OF CADMIUM BY POTASSIUM FERROCYANIDE.

The formula of cadmium ferrocyanide as usually given is $K_2CdFe(CN)_6$, the reaction between cadmium salts and potassium ferrocyanide being thus:

$$CdCl_2 + K_4Fe(CN)_6 = K_2CdFe(CN)_6 + 2KCl.$$

This will require 3.767 gram-molecules of potassium ferrocyanide to precipitate one gram-molecule of cadmium. In practice by titration of a commercially pure cadmium it was found to take 3.676 gram-molecules or a difference of two and one-half per cent.

The titration is as follows: 3.676 grams of potassium ferrocyanide are dissolved in a liter of water and the hot cadmium solution is titrated after addition of ammonium chloride in the same manner as zinc, using uranium acetate as indicator, the end-reaction being distinct. The cadmium ferrocyanide is white, as is zinc ferrocyanide, and as a result, zinc analyses by the ferrocyanide method will be high in proportion as cadmium is present.

P. A. MACKAY.