NOTES.

The Editor desires to point out that the pages of the Journal are open for the inclusion of short notes dealing with analytical practice and kindred matters. Such notes are submitted to the Publication Committee in the usual manner (see ANALYST, 1918, *p.* 2).

NOTE ON THE TITRATION OF COPPER WITH CYANIDE.

As is well known, the titration of ammoniacal copper solutions with potassium cyanide ceases to give a sharp end-point when the concentration of copper is much less than 1 grm. per litre. The authors have recently found it necessary to estimate copper concentrations of about one-tenth of this amount in presence of very large quantities of alkali carbonates. They have found that the solutions of the alkali copper carbonates in excess of sodium carbonate can be titrated directly with potassium cyanide with a very fair accuracy, even at concentrations of 0·1 grm. Cu per litre.

The solutions of alkali copper double carbonates are readily obtained by adding the solution containing the copper to be estimated to a warm solution containing about 70 grms. of sodium carbonate (anhydrous) and 50 grms. of sodium bicarbonate in 500 c.c. The bicarbonate is necessary, as otherwise precipitation of basic carbonate occurs. A standard solution of copper is prepared by dissolving a weighed amount of copper (about 0·1 grm.) in dilute acid, and mixing slowly, and with constant stirring, into half a litre of the carbonate-bicarbonate solution. The cyanide solution is then standardised against this solution as in the ordinary ammonia method.

The double carbonate solutions are a deep copper blue, quite unlike a cuprammonium blue. On adding cyanide the colour changes to a pale bluish-purple, which on further addition of cyanide changes to a greyish appearance, which marks the end-point of the reaction. It is somewhat difficult to recognise, but after some experience the authors have satisfied themselves that in a good daylight it is possible to work very constantly to this tint. It should be noted that the grey end tint is not permanent. The solution becomes quite clear and colourless after standing for a few minutes. It is, therefore, not possible to adopt the common plan of using one completed titration as a standard tint for subsequent titrations.

The titre of the solutions depends to a small extent on the amount of bicarbonate used in making up the solutions, as was shown by titrating the same cyanide solution against various standard copper solutions. It is therefore necessary either to have approximately equal concentrations of bicarbonate in the two solutions which are being compared, or to make an allowance for any difference in bicarbonate concentration.

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DETERMINATION OF CARBON IN STEEL.

Referring to the recent note (ANALYST, 1918, 59) on the determination of carbon by direct combustion, there is no doubt that the method is of great value if the steel is sufficiently finely divided, and that is the real difficulty. As to residues said to be left by certain special steels when treated by cupric chloride no difficulty arises, as the carbon in these will be burned completely provided the temperature is high enough.

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DETECTION OF ZIRCONIA.

It is good practice after separating a minute quantity of a given substance—say lead—from a large amount of material to identify that substance, whatever care may have been taken in isolating it. Sometimes this is easy, as in the case cited, and in many other instances the spectroscope will decide the matter at once. There are, however, cases which present difficulties. One of these is zirconia. There appears to be no characteristic reaction which will distinguish it as easily, for example, as one can distinguish cerium or titanium. Possibly someone can suggest a test of this definitive kind.

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