Judging from these figures, there can hardly be any question that the density of the solvent and not that of the solution is to be used in computing π by the hydrostatic method.

RUTGERS COLLEGE, May, 1898.

METHOD OF PREPARING A STRICTLY NEUTRAL AMMONIUM CITRATE SOLUTION.

BY A. D. COOK.

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FOR the benefit of many analytical chemists who are engaged in fertilizer work and for the purpose of securing uniformity in results, I respectfully submit the following pertaining to the neutrality and preparation of the chemical reagent "ammonium citrate."

This reagent has caused more trouble than all the other reagents required in fertilizer work, and yet it is an extremely easy matter to get a strictly neutral reaction.

The method adopted by the Association of Official Agricultural Chemists does not state the most essential fact in the preparation of this reagent, and the one which, if universally adopted, would overcome many obstacles in its preparation.

The failure to obtain a strictly neutral solution of ammonium citrate has caused great discrepancy in results among chemists who have analyzed the same material. I refer more particularly to the analysis of concentrated phosphates where there is a large per cent. of available phosphoric acid. The total phosphoric acid running as high as fifty per cent., the insoluble eleven per cent., making the available thirty-nine per cent. In the chemical laboratory at this station, where from 800 to 1000 samples of commercial fertilizers are analyzed annually, I have had ample opportunity to try different methods and to compare results obtained by chemists working with different solutions of ammonium citrate. It has been pointed out by fellow-workers in this field that a strictly neutral solution may be obtained by allowing the solution to stand after ammonia has been added to the citric acid and the proper dilution made. I have found that the practicability of this procedure depends upon the temperature of the solution. If vigorous stirring is neglected the solution will be slightly alkaline. Vigorous stirring, thus causing

heat by chemical action, will generate sufficient heat to drive off the excess of ammonia, and this is the main point to observe in securing its neutrality.

This reagent is made up as follows in this laboratory: 740 grams of commercial citric acid are carefully weighed out and placed in a four-liter graduate containing 1900 cc. of ten per cent. ammonium hydroxide. With a suitable glass rod the citric acid is thoroughly and vigorously stirred until the citric acid has all dissolved. Distilled water is now added until the meniscus reads 4000 cc. The solution is again stirred and carefully transferred to a large porcelain evaporating dish. The solution is allowed to stand over night and in the morning large oval crystals are noticeable on the sides of the four-liter graduate, and invariably the solution when tested for neutrality will be found strictly neutral. If the solution is not vigorously stirred sufficient heat will not be evolved to drive off the excess of ammonia, and when tested will be found to be slightly alkaline, but by resorting to vigorous stirring, a strictly neutral reaction will be obtained. The solution, after being transferred to the reagent bottle, is brought to the required temperature, 20° C., and distilled water added until the specific gravity is 1.09. On testing the neutrality of this solution, both with coralline and cochineal as indicators, it will be found unnecessary to alter its neutrality in the least degree, the solution being strictly neutral.

THE ASSAY OF TELLURIDE ORES.

BY CHARLES H. FULTON

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THE growing importance of telluride ores and the fact of their relative difficulty of assay in contrast with other ores, has led to this work. The object of the work was to determine where the difficulty and losses lay, and if possible to remedy these defects of the assay by proper methods and precautions.

Ore No. 1 is a telluride ore, having a gangue, mainly of quartz. A very small amount of pyrite is also present.

Ore No. 2 is a very rich telluride from Cripple Creek, Colorado, containing considerable pyrite. The gangue is siliceous.