pancreatin seem unable to decompose tartrate ions. Berkefeld filtrates of feces have this ability to a very limited extent, if at all. Carefully controlled tests with *Escherichia coli,* communior and acidi-lactici, however, have shown that all of these organisms can decompose the tartrate ions in Rochelle salts and produce alkali from this compound by this means.

The alkalinizing effect of tartrates, caused by bacterial decomposition of tartrate ions in the lumen of the intestine and the consequent freeing of easily-absorbable sodium and potassium ions, is probably their chief mode of action in cases where catharsis is not produced.

Our work is still in progress, and more detailed reports are in process of preparation.

5102

A New Synthesis of Aspartic Acid.*

M. S. DUNN AND B. W. SMART.

From the University of California at Los Angeles.

In previous syntheses of aspartic acid the following reactions have been used: The decomposition of acid ammonium malate by heat,[1] the racemization of active aspartic acid[2] and active asparagine,[3] the reaction of maleic or fumaric acid with ammonia,[4] the reduction of oxalacetic ester oxime,[5] the reaction of silver fumarate or potassium acid fumarate with hydroxylamine hydrochloride,[6] the reduction of nitrosuccinic ester,[7] the catalytic reduction and ammonation of oxalacetic acid,[8] and the hydrolysis of the addition compound formed from sodium malonic ester and chloroacetic ester.[9]

*Financial assistance in this work has been received from the research funds of the University of California.

[1] Dessaignes, *Compt. rend.*, 1850, xxx, 324; *Ibid.*, 1850, xxxi, 432. Wolff, *Ann.*, 1850, lxxv, 293.

[2] Michael and Wing, *Ber.*, 1884, xvii, 2984; *Am. Chem. J.*, 1885, vii, 278.

[3] Piutti, *Ber.*, 1886, xix, 1691.

[4] Engel, *Compt. rend.*, 1887, civ, 1805; *Ibid.*, 1888, cvi, 1734; Stadnikoff, *Ber.*, 1910, xliv, 44.

[5] Piutti, *Gaz. Chim. Ital.*, 1887, xvii, 519.

[6] Tanatar, *Ber.*, 1896, xxix, 1477.

[7] Schmidt and Widman, *Ber.*, 1909, xlii, 497.

[8] Knoop and Oesterlin, *Z. physiol. Chem.*, 1925, cxlviii, 294.

[9] Keimatsu and Kato, *J. Pharm. Soc. Japan*, 1929, xlix, 111 and 123.

The present synthesis is believed to be more satisfactory than those previously reported for aspartic acid.

Phthalimido malonic ester, prepared from potassium phthalimide and bromodiethylmalonate, was converted to sodium phthalimido malonic ester by allowing it to react with molten metallic sodium suspended in toluene. A stable addition product was then formed as a dark colored oil by the reaction of chloroacetic ester with sodium phthalimido malonic ester. This product was readily hydrolyzed by hydrochloric acid with the formation of d,l aspartic acid, phthalic acid, carbon dioxide, and ethyl alcohol. Side reaction products are not probable.

The acid hydrolysate was evaporated to precipitate the phthalic acid which was removed by filtration. Hydrochloric acid was removed by the addition of the calculated quantity of silver oxide to the boiling diluted filtrate. After removing the precipitate of silver chloride and evaporating the filtrate to a small volume d,l aspartic acid crystals separated after standing for 3 days. Upon recrystallization from hot, 50% ethyl alcohol these crystals darkened and decomposed over the range, 311-325°C. Within the limits of experimental error they were shown to contain the theoretical quantity of amino nitrogen.

Additional experiments on the reaction of ethylene bromide, ethylene chloride, methylene bromide, beta chloropropionitrile, beta chloropropionic ester, and trimethylene bromide were carried out. In all cases the liberation of halide ions was nearly complete, but only with trimethylene bromide was the expected addition product formed. This reaction has been used by Sorenson[10] for the synthesis of proline.

5103

Use of Phenol Red in the Addis Test of Renal Function.

EATON M. MACKAY.

From the Scripps Metabolic Clinic, La Jolla, San Diego, California.

Under certain special conditions the rate of urea excretion in the urine is directly proportional to the blood urea concentration so that the ratio $\frac{\text{Urine rate}}{\text{Plasma concentration}}$ becomes a constant.[1] Under these

[10] Sorenson, *Z. physiol. Chem.*, 1908, lvi, 236.

[1] Addis, T., and Drury, D. R., *J. Biol. Chem.*, 1923, lv, 105.