The Action of Dichlorocarbamide on Benzylamine.—A strong solution of benzylamine, preferably 60%, is cooled in ice as before and to it a well-cooled solution of dichlorocarbamide is gradually added, with shaking, taking care that no considerable amount of hydrolysis takes place. Care must be taken to use only a small quantity of the chlorourea, keeping the amine in considerable excess. Within a very short time of the addition, the liquid becomes thick with a mass of flocculent precipitate. The precipitate thus obtained is filtered, washed repeatedly with hydrochloric acid to free it from the excess of benzylamine and another basic substance, which is under examination. The substance thus obtained does not give a definit melting point, since it is a mixture of *p*-urazine and the tetrazine derivative, the latter being present in much greater quantity than the former. To effect a separation, the crystallin mass is warmed with a small quantity of acetone when the *p*-urazine derivative remains undissolved, the tetrazine derivative passing into solution. On evaporating the acetone solution and effecting a second recrystallization from the same solvent, the substance is found to melt sharply at 146°. It was analyzed with the following results:

Sample I. Found: C, 70.32; N, 14.93; H, 6.12.
Sample II. Found: C, 70.21; N, 14.98; H, 5.97.
Calculated for $C_{22}H_{22}N_4O_2$: C, 70.58; N, 14.97; H, 5.88.

The residue left on the filter is washed with acetone and is found to be *p*-urazine, giving a melting point, 264°–266°. (Found, N = 48.01; calc. N = 48.27.)

Further researches on the application of dichlorocarbamide as a synthetic agent are being continued.

Our thanks are due to Prof. P. C. Rây for his encouragement in carrying on the above investigation.

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IODOPLATINATES OF SUBSTITUTED AMMONIUM AND SULPHONIUM BASES.

BY RASIK LAL DATTA.

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In continuation of the researches on the double iodides, several of which with platinum and copper have already been described,[1] it was thought advisable to prepare other double platinic iodides, especially of the heavily substituted ammonium bases and also to determin clearly the condition of the precipitation of such salts. The method of preparation by double decomposition is also extended to the double platinic iodides of the sulfonium bases.

It has been pointed out in my previous paper, that double platinic iodides

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[1] Datta, *J. Chem. Soc.*, **103**, 426 (1913).

of sodium and alkalin earth metals could not be precipitated, like the double iodides of substituted ammonium bases, by the direct addition of platinic chloride to strong solutions of the iodides. But it has been found that double platinic iodides of potassium and ammonium could be precipitated directly by the addition of chloroplatinic acid to saturated solutions of the iodides. These were used to be prepared in the pure state, as pointed out in my previous paper, by Lassaigne,[1] by crystallizing platinic iodide with potassium and ammonium iodides, and it has also been shown that the methods depicted by Mather and Platt[2] and Kane[3] lead to the production of highly impure compounds. Hence the present method furnishes a ready and convenient way for preparing the double platinic iodides of potassium and ammonium, and it has an obvious advantage over Lassaigne's method, since in the latter case platinic iodide itself had to be prepared at the outset.

It is necessary to mention here that during my attempts to prepare double platinic iodides with the hydriodides of hydrazine, it was observed that immediate reduction took place, with the separation of metallic platinum, on the addition of chloroplatinic acid even to highly concentrated solutions of the iodides.

Potassium Iodoplatinate.—When a solution of chloroplatinic acid is added to an excess of potassium iodide, the resulting fluid assumes a red color, due to the liberation of platinic iodide, with the formation of the double salt in solution. The extreme solubility of the double salt prevents its precipitation in dilute solutions, but it has been found that the salt is practically insoluble in a concentrated solution of potassium iodide and hence is precipitated with such solutions. This is evidently due to the suppression of ionization of the double salt by potassium iodide. The salt is prepared by adding a solution of chloroplatinic acid, preferably 10%, to a saturated solution of potassium iodide with shaking, when a black crystallin precipitate, consisting of the double iodide, is precipitated, the yield being quantitative. The more concentrated the solution of potassium iodide, the more complete is the precipitation, which is evident from the faint color of the resulting solution, after filtering off the precipitate. The chief point in the preparation of the pure salt is that a sufficiently large excess of potassium iodide has to be used, otherwise the potassium chloride which is formed as a result of double decomposition might combine with the added chloroplatinic acid to form potassium chloroplatinate, which might be precipitated along with the double iodide thus contaminating it. The employment of excess of the iodide not only applies to the preparation of this salt, but is a necessary condition of the

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[1] *Ann.*, **8**, 185 (1833).

[2] *Am. J. Sci.*, **27**, 257 (1834).

[3] *Phil. Mag.*, **2**, 198 (1833).

method. The precipitate as obtained above is first sucked, to free it from adhering mother liquor, and then washed first with a small quantity of water and then with a little alcohol. Employment of a large quantity of water is to be guarded against, since the salt is extremely soluble in water. The salt consists of a crystallin black powder.

Calculated for K_2PtI_6: Pt, 18.94; I, 73.62; found: Pt, 18.69; I, 73.33.

The estimation of iodine and platinum was simultaneously carried out by Wallach's[1] method.

Ammonium Iodoplatinate.

To an excess of a moderately strong solution of ammonium iodide, a 10% solution of chloroplatinic acid is added gradually with shaking, when a black, amorphous precipitate comes down, which, after washing with a little water and dilute alcohol, is dried in the desiccator.

Calculated for $(NH_4)_2PtI_6$: Pt, 19.64; I, 76.73; found: Pt, 19.77; I, 76.50.

The salt thus obtained is a black powder soluble in water to form a dark red solution. The solubility is less than that of the corresponding potassium salt. It is practically insoluble in a saturated solution of ammonium iodide. On ignition the salt decomposes, giving out iodine vapors first and then white clouds of ammonium iodide, leaving metallic platinum behind.

Dipropylammonium Iodoplatinate.—On the addition of chloroplatinic acid to a solution of dipropylammonium iodide, a black precipitate is produced, which is moderately soluble in water to form a red solution. The salt is dried as usual.

Calculated for $2N(C_3H_7)_2H_2I, PtI_4$: Pt, 16.79; found: Pt, 16.82.

Tetrapropylammonium Iodoplatinate.—On adding chloroplatinic acid to a dilute solution of tetrapropylammonium iodide, a whitish precipitate is produced, which deepens in color to brown, finally turning violet. The filtrate is colored faintly red. Evidently the salt is very sparingly soluble in water. The salt, on drying in the desiccator, has a fine chocolate color.

Calculated for $2N(C_3H_7)_4I, PtI_4$: Pt, 14.67; found: Pt, 14.85.

α-Picolinium Iodoplatinate.—This is a black precipitate, obtained as usual by adding chloroplatinic acid to α-picolinium iodide, moderately soluble in water to form a red-brown solution.

Calculated for $2C_6H_7NHI, PtI_4$: Pt, 17.03; found: Pt, 16.82.

Quinolinium Iodoplatinate.—The salt is obtained as a jet black precipitate, having the appearance of lampblack, by the addition of chloroplatinic acid to quinolinium hydriodide. The salt is sparingly soluble in water.

Calculated for $2C_9H_{17}NHI, PtI_4$: Pt, 16.56; found: Pt, 16.68.

Trimethylsulfonium Iodoplatinate.—To a moderately strong solution of trimethylsulfonium iodide, a solution of chloroplatinic acid is added.

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[1] *Ber.*, **14**, 743 (1881).

At first there is no precipitation, but on shaking, a precipitate coagulates out from the solution. If the precipitate be immediately filtered, a dark red filtrate is obtained, which, on standing, becomes hazy and deposits a further quantity of the precipitate, leaving the solution less deep in tint. The precipitate obtained above is filtered, washed with a small quantity of water and dried in the desiccator. The salt consists of a black powder.

Calculated for $2S(CH_3)_3I, PtI_4$: Pt, 17.55; found: Pt, 17.63.

Triethylsulfonium Iodoplatinate.—Unlike the previous salt, this is obtained as a fine chocolate-colored precipitate by adding chloroplatinic acid to triethylsulfonium iodide. The salt is dried as usual in the desiccator and analyzed.

Calculated for $2S(C_2H_5)_3I, PtI_4$: Pt, 16.32; found: Pt, 16.51.

Investigations on similar lines are being continued.

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ON SOME CONDITIONS AFFECTING THE ACTIVITY AND STABILITY OF CERTAIN FERMENTS. II.

BY J. H. LONG AND W. A. JOHNSON.

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In a recent paper[1] we have described the action of weak acids and alkalies on one of the constituents of pancreatin, the amylopsin. In this paper we wish to present facts bearing on the behavior of tryspin, the other important ferment in pancreas preparations, under the same conditions.

Popularly, pancreatin is supposed to contain notable amounts of the two ferments and sometimes the lipolytic enzyme is assumed to be present, but practically only one of these is contained in appreciable amounts in the ordinary commercial products, *viz.*, the starch-converting enzyme. As described in the Pharmacopoeia of the United States, and in other similar works, pancreatin should contain a proteolytic enzyme, active in alkalin or neutral medium, but very few of the manufactured products have any proteolytic power whatever.

From a study of the literature bearing on trypsin and its relations to acids and alkalies it is evident that observers have had in hand extremely weak products only, with a converting power far below that of pepsin of laboratory or commercial manufacture. Attempts to produce trypsin by the processes originally described by Kühne[2] yield at best a very weak product, with which it is difficult to make satisfactory experiments on the behavior of acids and alkalies. The effects are in all cases modified by the presence of relatively large amounts of accompanying inert pro-

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[1] THIS JOURNAL, 35, 895.

[2] *Verhand. des naturhist. med. Vereins zu Heidelberg,* 1877, p. 194. *Untersuchungen aus dem phys. Inst. der Universität Heidelberg,* I, 1878.