

LETTERS TO THE EDITOR

	PAGE		PAGE
Reaction between Ethyl Iodide and Copper Salts. BY V. D. TASKAR, M. S. TELANG AND V. V. NADKARNY	404	Two New Genes Conditioning the Tint of the Colour on the Glumes of Sorghum. BY G. N. RANGASWAMI AYYANGAR AND B. W. X. PONNAIYA	410
A Sensitive Test for the Detection of Argemone Oil. BY S. N. SARKAR	405	Kernels of <i>Thevetia nerifolia</i> Juss.—A Potent Insecticide. BY M. C. CHERIAN AND S. RAMACHANDRAN	412
An Improved Volumetric Method for the Estimation of Uric Acid. BY Y. V. NARAYANAYYA	405	Genetical Studies of <i>Eri</i> Silkworms—(<i>Attacus ricini</i> Boisd). BY M. C. CHERIAN AND V. MAHADEVAN	412
Top-Rot ('Twisted Top' or 'Pokkah Bong') of Sugarcane, Sorghum and Cumbu. BY T. S. RAMAKRISHNAN	406	Effect of Storage on the Quality of Pongamia Oil. BY N. V. SUBBA RAO AND T. R. SESHADRI	413
The Occurrence and Inheritance of a Bloomless Sorghum. BY G. N. RANGASWAMI AYYANGAR AND B. W. X. PONNAIYA	408	A <i>Margosa</i> Tree without the Bitter Principle. BY M. J. THIRUMALACHAR	413
The Occurrence and Inheritance of Shoots from the Axils of Panicle Branches in Sorghum sudanense. BY G. N. RANGASWAMI AYYANGAR AND B. W. X. PONNAIYA	409	— BY K. CHERIAN JACOB	414

REACTION BETWEEN ETHYL IODIDE AND COPPER SALTS

DURING our investigations on the catalytic effects of various salts on the kinetics of the persulphate-alkyl-iodide reaction,¹ we observed that copper salts accelerated the reaction to a great extent. This anomaly could not be explained. Now, it has been found that there is a reaction taking place between copper salts and ethyl iodide even in the absence of the persulphate, liberating free iodine and hence the abnormally high results are obtained in the persulphate-alkyl-iodide reaction catalysed by copper salts.

This action of copper salts on ethyl iodide can be compared with the action of mercuric and silver salts on alkyl halides.² These two ions, silver and mercuric, have a great affinity for the halide ion, which may be due to the small ionisation of the mercuric halides, to the insolubility of the silver halides, or to the fact that silver halides dissolve in excess of halide ion forming complexes of the nature of AgI_2 . It may be possible that other ions which form moderately stable complex halide ions like copper may also bring about similar reactions with alkyl halides.³ This deduction led us to investigate the action of copper salts on alkyl halides.

We have found that the progress of the reaction can be followed by the ordinary iodometric method, after extracting the iodine with benzene. Such extraction of iodine is necessary on account of the deep colour of copper salts which mask the colour of iodine, making a direct titration against standard thiosulphate solution impossible.

The reaction has been found to be kinetically of the first order, with respect to the alkyl iodide. The probable mechanism of the reaction may be a preliminary dissociation of the alkyl halide into free radicals (a unimolecular process) followed by faster reactions involving copper ions and iodine ions or radicals as in the persulphate-alkyl-iodide reaction.⁴ Further details regarding this will be published later on.

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¹ Telang and Nadkarny, *J. Indian Chem. Soc.*, 1939, **16**, 536.

² Burke and Donnan, *J. Chem. Soc.*, 1904, **85**, 555.

³ Hammett, *Physical Organic Chemistry*, 1940, 138.

⁴ Telang and Nadkarny, *Curr. Sci.*, 1940, **9**, 226.