XXXI.—*Contributions to a Knowledge of Cyanuric Derivatives.*

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By the action of ammonia on cyanuric chloride, Liebig (*Annalen*, **10**, 45) obtained chlorocyanamide, $C_3H_4N_5Cl$. The corresponding aniline compound was discovered soon afterwards by Laurent (*Ann. Chim. Phys.* [3], **22**, 97), and quite recently similar chlorine-derivatives have been obtained by various investigators, especially by A. W. Hofmann (*Ber.*, **18**, 2755) and Claësson (*Bihang till K. Svenska Vet. Akad. Handlingar*, Bd. **10**, No. 6), who acted on cyanuric chloride with amines. The final action of ammonia, or of the amines, on cyanuric chloride, is the production of simple or substituted melamines. Thus it is clear, as foreseen by the above-mentioned observers, that the compounds still retaining chlorine are intermediate derivatives between the trichloride on the one hand, and the melamine on the other. Take, for example, the methylamine series of substitutions :—

$(C:N)_3Cl_3$. Cyanuric chloride. $(C:N)_3(NHCH_3)Cl_2$ $(C:N)_3(NHCH_3)_2Cl$. Intermediate compounds.

$(C:N)_3(NHCH_3)_3$. Trimethylmelamine.

All of these are known, with the exception of the first intermediate compound; this dichloro-derivative is also wanting in the other series which have hitherto been studied. The experiments with α-naphthylamine, which form the subject of this communication, have, however, given all these compounds. Similar results are to be expected in the case of β-naphthylamine, with the investigation of which I am at present engaged.

Primary α-Naphthylamido-cyanuric Chloride.—Solutions of cyanuric chloride and α-naphthylamine in dry ether are quickly mixed together in the proportion of 1 mol. of the chloride to 2 mols. of the α-naphthylamine.

A precipitate of α-naphthylamine hydrochloride occurs, which is removed by filtration, and the filtrate is evaporated to dryness. The residue crystallised several times from hot alcohol gives colourless needles of primary α-naphthylamido-cyanuric chloride,

$$(C:N)_3(NH\cdot C_{10}H_7)Cl_2 = C_{13}H_8N_4Cl_2,$$

melting at 149°. The formula requires—

	Theory.		Experiment.			
C_{13}....	156	53·61	53·47	—	—	—
H_8....	8	2·75	3·01	—	—	—
N_4....	56	19·24	—	19·05	18·94	—
Cl_2....	71	24·40	—	—	—	24·44
	291	100·00				

Secondary α-Naphthylamido-cyanuric Chloride.—In this instance, the ethereal solutions are mixed slowly, drop by drop, and in the proportion of 4 mols. of α-naphthylamine to 1 mol. of cyanuric chloride. The precipitated α-naphthylamine hydrochloride is removed as before, and the residue, after evaporation, recrystallised several times from hot alcohol. In this way, colourless needles of secondary α-naphthylamido-cyanuric chloride, $(C:N)_3(NHC_{10}H_7)_2Cl = C_{23}H_{16}N_5Cl$, are obtained, melting at 215°. This requires—

	Theory.		Experiment.		
C_{23}....	276	69·43	69·32	—	—
H_{16}....	16	4·02	4·25	—	—
N_5.....	70	17·60	—	17·51	—
Cl	35·5	8·95	—	—	9·21
	397·5	100·00			

The secondary compound is much more soluble in alcohol than the primary derivative, and by taking advantage of this fact they may be separated if they occur mixed together.

Tertiary α-Naphthylmelamine.—Tertiary α-naphthylmelamine is formed when either of the above compounds is heated for several hours at 100° in a closed tube, together with the theoretical proportion of α-naphthylamine. The melamine found is washed with alcohol and water, and recrystallised from chloroform. It melts at 223°, and has the formula $(C:N)_3(NHC_{10}H_7)_3 = C_{33}H_{24}N_6$. This requires the following values:—

	Theory.		Experiment.		
C_{33}.....	396	78·57	78·33	—	—
H_{24}.....	24	4·76	4·90	—	—
N_6.....	84	16·67	—	16·67	16·85
	504	100·00			

Thus, in the case of α-naphthylamine, the whole series of derivatives theoretically possible are obtained, and there can be but little

doubt that the primary amido-compound can be prepared in the case of other amines, and with ammonia itself by working under suitable conditions.

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