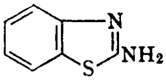
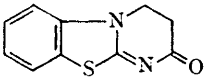
Formation of Two Novel Heterocycles

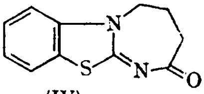
By G. TSATSAS* and E. COSTAKIS
(*Laboratory of Pharmaceutical Chemistry, University of Athens,* 104 *Solonos Street, Athens*—144, *Greece*)

DURING studies on 2-aminobenzothiazole (I), we have synthesised 2-(ω-chloroacylamino)benzothiazoles (II), so that the pharmacological properties of the products of the reaction of these chloroacylamino-derivatives (II) with various amines can be examined.[1] While the reaction of 2-aminobenzothiazole with chloroacetyl chloride proceeds normally, leading exclusively to the corresponding 2-(2-chloroacetamido)benzothiazole (II, $n = 1$), the reaction with β-chloropropionyl and γ-chlorobutyryl chloride shows certain peculiarities.


(I)


(II)


(III)


(IV)

Reaction of equimolar quantities (chloroform solution) of 2-aminobenzothiazole and β-chloropropionyl chloride in alkaline medium (Na_2CO_3) gives 2-(3-chloropropionylamino)benzothiazole (II, $n = 2$, 45—50% yield) and a halogen-free product ($C_{10}H_8N_2OS$, m.p. 214—217°, 18—20% yield). We assign to this product the structure (III), which is confirmed by elemental analysis, mass-spectral determination of the molecular weight and spectra† [λ_{max} 218 mμ (ϵ 27,000) and 310 mμ (ϵ 25,500); ν_{max} (KBr) 6·05 μ]. The corresponding chloroacyl compound (II) ($n = 2$) presents a λ_{max} at 275 mμ of moderate intensity and ν_{max} (KBr) at 5·92 μ. Compound (III) being too insoluble in the usual solvents, it was not possible to obtain its n.m.r. spectrum.

Reaction of 2-aminobenzothiazole with γ-chlorobutyryl chloride under the same experimental conditions leads to the corresponding chloroamide (II, $n = 3$, 80% yield). This, on reaction with certain amines, *e.g.*, diethylamine and piperidine, gives a compound $C_{11}H_{10}N_2OS$, m.p. 177—178°, instead of the desired alkylaminoacylamino-derivative. Again, the structure (IV) assigned to this product is confirmed by elemental analysis and spectral data. Of considerable value for this assignation is the n.m.r. spectrum obtained in $CDCl_3$—CCl_4 solution at 60 Mc./sec. (Me_4Si as internal standard); signals appear at δ 2·0—2·8 p.p.m. as a multiplet (4H), δ 4·21 p.p.m. as a triplet (2H, $-CO-CH_2-$) and δ 7·2—7·9 p.p.m. as a multiplet (4H, aromatic).

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† All new compounds gave satisfactory elemental analyses. U.v. spectra were measured in absolute ethanol solution.

[1] G. Tsatsas and N. Vassiliadou, *Bull. Soc. chim. France*, 1962, 736.