A Convenient Synthesis of β- and γ-Fluoro-alcohols

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CYCLIC carbonates, by successive treatment with magnesium halides in ether and with water, give[1] good yields of the corresponding halogenohydrins. Anhydrous potassium fluoride in diethylene glycol reacts analogously, converting the cyclic carbonates of 1,2 and 1,3-glycols into β- and γ-fluoro-alcohols, respectively. This method supplements in many cases the known[2] preparation of β-fluoro-alcohols from the corresponding β-chloro-alcohols.

General Procedure—A mixture of the cyclic carbonate (0·2 mole), anhydrous potassium fluoride (25 g.), and diethylene glycol (150 ml.) is heated. At 160—165° (flask temperature), reaction sets in, indicated by a slow liberation of carbon dioxide, and the product begins to distil. The temperature is increased to 190° during 1 hr.; finally, the receiver is cooled (ice–salt) and the pressure reduced to 30 mm. so as to collect all products boiling below 100°/30 mm. The distillate is dissolved in methylene chloride (30 ml.), dried (potassium carbonate), and redistilled. Thus, we obtained: 2-fluoroethanol (55%), b.p. 100—102°/700 mm. (lit.[3] b.p. 101°), from ethylene carbonate; 2-ethyl-2-fluoromethylbutan-1-ol (45%), b.p. 61—63°/35 mm., from 2,2-diethyltrimethylene carbonate; and 2-fluoromethyl-2-methylpentan-1-ol (50%), b.p. 65—67°/35 mm., from 2-ethyl-2-methyltrimethylene carbonate.

(*Received, March 2nd,* 1965.)

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