NEW COMPOUND

2-(4-Diethylamino-1-methylbutylamino)-4-hydroxyquinazoline[1]

2-Chloro-4-methoxyquinazoline[2] (3.0 g.) and 4.8 g. of purified noval diamine[3] were heated two and a half hours at 125–130°. The thick oil was dissolved in 40 cc. of 6 *N* hydrochloric acid and the solution heated six hours on the steam-bath. Then 20 cc. of concentrated hydrochloric acid was added and the solution allowed to stand overnight.

The solution was made strongly alkaline with sodium hydroxide, and was extracted with ether. Between the ether and aqueous layers there was a considerable layer of a thick red-brown oil. The aqueous layer was saturated with carbon dioxide gas; a gummy white solid separated. It was picked out and dissolved in acetone, while the carbonate solution was extracted with ether. The ether and acetone solutions were combined and evaporated to dryness, and the residue sublimed in a high vacuum with the temperature of the oil-bath surrounding the sublimation apparatus at 100–150°. The creamy-white crystalline sublimate of the quinazoline derivative melted at 165–167°; yield, 0.44 g. (9.5%).

The product from another run was purified by repeated sublimation. White crystals, m. p. 177.5–181°, were obtained.

Anal. Calcd. for $C_{17}H_{26}ON_4$: C, 67.51; H, 8.67. Found: C, 67.64; H, 8.69.

Samples of this compound melted as a rule at about 90°, then resolidified and melted again at the temperatures reported above.

(1) This work was done under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the University of Rochester.

(2) Lange, Roush and Asbeck, THIS JOURNAL, **52**, 3699 (1930).

(3) Jones, *Ind. Eng. Chem., Anal. Ed.*, **16**, 431 (1944).

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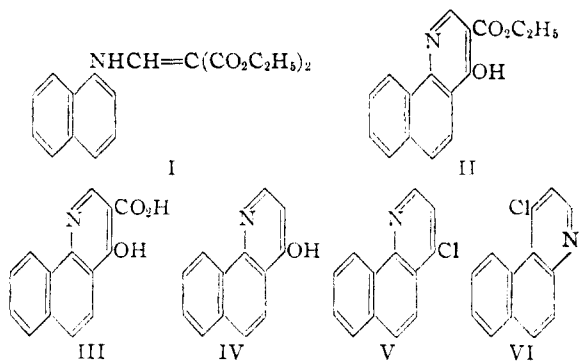
[CONTRIBUTION FROM THE AVERY LABORATORY OF CHEMISTRY OF THE UNIVERSITY OF NEBRASKA]

Some γ-Substituted Benzoquinoline Derivatives[1]

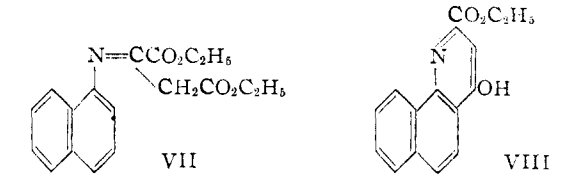
BY ROBERT E. FOSTER, ROBERT D. LIPSCOMB, THEOS. J. THOMPSON[2] AND CLIFF S. HAMILTON[3]

In a continuation of the study of derivatives of benzoquinolines which has been carried on in this Laboratory,[4] the syntheses of 4-chlorobenzo(h)-quinoline and 1-chlorobenzo(f)quinoline have been carried out by the method of Price and Roberts.[5] In addition, the former compound has been synthesized by an alternative method employing ethyl ethoxalylacetate, and derivatives of both chloro compounds have been prepared.

The synthesis of 4-chlorobenzo(h)quinoline involved initially the condensation of ethyl ethoxymethylenemalonate with 1-naphthylamine to give ethyl 2-naphthylaminomethylenemalonate (I). Cyclization of (I) in phenyl ether at 250° gave 3-carbethoxy-4-hydroxybenzo(h)quinoline (II) which yielded 3-carboxy-4-hydroxybenzo(h)quinoline (III) upon hydrolysis in alkaline solution. When the acid (III) was heated near its melting point, carbon dioxide was evolved and 4-hydroxybenzo(h)quinoline (IV) was obtained. Conversion of this product to 4-chlorobenzo(h)quinoline (V) was readily accomplished by treatment with a mixture of phosphorus oxychloride and phosphorus pentachloride. The synthesis of 1-chlorobenzo(f)quinoline (VI) was carried out in an exactly analogous manner starting with 2-naphthylamine.



In the synthesis involving ethyl ethoxalylacetate, the initial condensation with 1-naphthylamine yielded ethyl 1-naphthyliminosuccinate (VII). This compound was cyclized in mineral oil at 230° to yield an isomer of II, namely, 2-carbethoxy-4-hydroxybenzo(h)quinoline (VIII). This ester was converted to the corresponding acid by alkaline hydrolysis; subsequent decarboxylation yielded 4-hydroxybenzo(h)quinoline (IV).



The over-all yield of γ-chlorobenzoquinoline prepared by either method was above 35%. The method using ethyl ethoxymethylenemalonate

(1) A part of the work described in this manuscript was done under contract OEMsr-85, recommended by the National Defense Research Committee, between the Office of Scientific Research and Development and the Board of Regents of the University of Nebraska.

(2) Part of the work described in this paper was taken from a thesis submitted to the graduate faculty of the University of Nebraska by Theos. J. Thompson in partial fulfillment of the requirements for the degree of Master of Science.

(3) Responsible investigator.

(4) For preceding communications see Gobeil and Hamilton, THIS JOURNAL, **67**, 511 (1945).

(5) Price and Roberts, *ibid.*, **68**, 1208 (1946).