and shaken at constant temperature until no further drop in hydrogen pressure was noted.

The reaction mass was filtered to remove the catalyst and the liquid product was carefully fractionated or recrystallized. (See Table I for the data.) The fractionizations were carried out with a 10-plate, glass helices-packed column. A Corad head was used with the column.

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Analogs of 4-(*p*-Dimethylaminostyryl)-quinoline[1]

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The anti-tumor activity of 4-(*p*-dimethylaminostyryl)quinoline(I)[2-5] and 1-(*p*-dimethylaminostyryl)naphthalene[6] encouraged us to synthesize several analogous compounds in which a nitrogen atom occupies the place of one of the carbons in the ethylene bridge. *N*-(*p*-Dimethylaminophenyl)quinoline-4-aldimine did not produce regression or significant inhibition of the growth of Lymphoma 8 tumors in rats, either when the compound was mixed in the diet or administered by subcutaneous injection of a solution in vegetable oil, although identical concentrations of I brought about prompt regression of similar tumors.[7] The following new compounds have not yet been tested against tumors.

EXPERIMENTAL

N-(*p*-Dimethylaminophenyl)naphthalene-1-aldimine. A mixture of 22 g. of *p*-aminodimethylaniline and 24.8 g. α-naphthaldehyde was heated 5 hr. at 135°. The product was recrystallized from ethyl acetate, from isohexane, and four times from isopropyl ether to yield 7.4 g. (17%) dark yellow crystals, m.p. 77–79°.

Anal.[8] Calcd. for $C_{19}H_{18}N_2$: C, 83.20; H, 6.57. Found: C, 83.08, 82.82; H, 6.57, 6.76.

N-(*p*-Dimethylaminophenyl)pyridine-4-aldimine. A mixture of 8.6 g. of pyridine-4-aldehyde and 10.9 g. of *p*-dimethylaminoaniline was heated 45 min. at 105°. The dirty green crystals were recrystallized twice from isopropyl ether to give 8.5 g. (47%) of light yellow crystals, m.p. 195°.

(1) The research was aided by a grant from the American Cancer Society.

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(8) Analyses by Drs. G. Weiler and F. B. Strauss, Oxford, England.

Anal. Calcd. for $C_{14}H_{15}N_3$: C, 74.68; H, 6.71. Found: C, 74.75; 74.75; H, 6.79, 6.59.

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4-[4-(*p*-Dimethylaminophenyl)-1,3-butadienyl]quinoline[1]

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The activity of 4-(*p*-dimethylaminostyryl)quinoline[2,3] and 4-(*p*-dimethylaminostyryl)quinoline methiodide[4] in causing regression of Lymphoma 8[5] tumors in rats encouraged the authors to synthesize the corresponding compounds in which the ethylene bridge is replaced by a butadiene bridge. The antitumor activity of the compounds has been investigated at the Wistar Institute of Anatomy and Biology through the cooperation of Dr. Margaret Reed Lewis, Dr. Boland Hughes, and Aubrey L. Bates, with the assitance of a grant from the National Cancer Institute. 4-[4-(*p*-Dimethylaminophenyl)-1,3-butadienyl]quinoline did not seem exceptionally toxic but had little or no effect on Lymphoma 8 when fed at a concentration of 0.03% in the diet. The methiodide, however, seemed more toxic than 4-(*p*-dimethylaminostyryl)quinoline methiodide.

EXPERIMENTAL

4-[4-(p-Dimethylaminophenyl)-1,3-butadienyl]quinoline. A mixture of 10.3 g. (0.059 mole) of *p*-dimethylaminocinnamaldehyde,[6] 8.5 g. (0.059 mole) of lepidine, and 2.1 g. (0.03 mole) of anhydrous zinc chloride was heated 8 hr. at 120°. The resulting tar was washed thoroughly with concentrated ammonium hydroxide and crystallized from ethanol. The 7 g. of crude product was recrystallized twice from ethyl acetate to obtain 1.3 g. of brown crystals, 7%, m.p. 165–166°.

Anal.[7] Calcd. for $C_{21}H_{20}N_2$: C, 83.95; H, 6.77. Found: C, 83.74, 83.82; H, 6.59, 6.51.

4-[4-(p-Dimethylaminophenyl)-1,3-butadienyl]quinoline methiodide. A mixture of 15 g. (0.080 mole) of *p*-dimethylamino cinnamaldehyde and 22.5 g. (0.079 mole) of lepidine methiodide was poured into 500 ml. of boiling acetic an-

(1) This project was aided by a grant from the American Cancer Society.

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(7) Analyses were carried out by Galbraith Microanalytical Laboratories, Knoxville, Tenn.