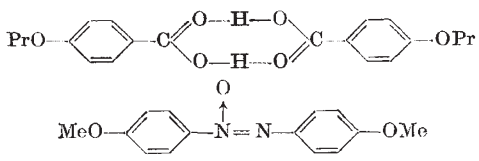
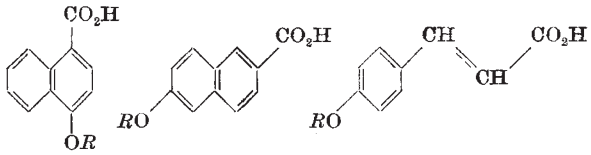


The structural features necessary for the occurrence of double refraction in a liquid have been discussed by Vorländer; but the relative importance of length and flat-area as factors in bringing about this phenomenon is not clear. It is well known that the cholesteryl esters of the saturated fatty acids exhibit marked mesomorphism.

In an attempt to determine more clearly the significance of these factors, the study of the alkoxy-aromatic carboxylic acids has been extended to 4-*n*-alkoxy-1-naphthoic and 6-*n*-alkoxy-2-naphthoic acids, and some twenty-six of these acids have been synthesized and examined.



I II III

Of the thirteen 4-*n*-alkoxy-1-naphthoic acids (I) prepared, none shows mesomorphism ($R = CH_3$ to $C_{10}H_{21}$, $C_{12}H_{25}$, $C_{16}H_{33}$ and $C_{18}H_{37}$). The first members of this series ($R = CH_3$ to C_8H_{17}), like *p*-methoxy- and *p*-ethoxybenzoic acids, melt at temperatures above 180° C., but the melting points of the higher members are much lower. The absence of mesophases in these acids may be due to the fact that the broad naphthalene nuclei, lying at right angles to the long axis of the dimerized molecules, prevent them from orientating themselves in such a way that mesomorphism becomes possible. It is significant in this connexion that the introduction of chlorine atoms into the ortho-positions of *p*-*n*-amyloxybenzoic acid destroys its mesomorphism.

Unlike the 4-*n*-alkoxy-1-naphthoic acids, the isomeric 6-*n*-alkoxy-2-naphthoic acids (II) show mesophases. In the case of twelve of the thirteen acids prepared ($R = CH_3$, C_2H_5, C_4H_9 to $C_{10}H_{21}$, $C_{12}H_{25}$, $C_{16}H_{33}$ and $C_{18}H_{37}$) the mesomorphism is readily observed; but with the *n*-propoxy- acid the temperature-range of the nematic form is only a fraction of a degree. A nematic phase only is found in the first nine members of this series, the temperature-range of which reaches a maximum of 49° in the hexyloxy- acid. With the decyloxy- acid a smectic phase appears, the nematic henceforth becoming less pronounced as the length of the alkyl group is increased. These 6-*n*-alkoxy-2-naphthoic acids, which show structural similarities to the *trans* *p*-*n*-alkoxycinnamic acids (III), are long molecules without the breadth found in their isomers of structure (I), and therefore able to orientate themselves so that mesomorphism can occur.

Examples of mesomorphism in naphthalene compounds are not common; the best known are the anils of 2 : 6-diaminonaphthalene, but Vorländer[3] has shown that certain 1 : 4-disubstituted naphthalene systems exhibit mesomorphism. These, however, are resins or lacquers, such as anisal-1-amino-naphthalene-4-azobenzene. In such complex structures the broad naphthalene nucleus is near the centre of the molecule and, as a result, is probably of less importance than it is in the dimerized 4-*n*-alkoxy-1-naphthoic acids.

In view of the difference in behaviour between the 4-*n*-alkoxy-1-naphthoic and the 6-*n*-alkoxy-2-naphthoic acids, the properties of the 5-*n*-alkoxy-1-naphthoic acids may be of particular interest.

A fuller account of these investigations will be published elsewhere. In the meantime, other series of compounds are being examined.

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[1] Jones, Brynmor, *J. Chem. Soc.*, 1874 (1935).
[2] Bennett and Jones, Brynmor, *J. Chem. Soc.*, 420 (1939).
[3] Vorländer, *Trans. Farad. Soc.*, 899, 907 (1933).

Antihistamines and Thyroxine Metamorphosis in Tadpoles

Szebehely and co-workers[1] ascertained that in mice desensitized with histamine the basal metabolic rate rose much less after thyroxine administration than in mice not so desensitized. Antihistamines were too toxic, and so they could not demonstrate convincingly that their effect was similar to that of histamine desensitization.

Using tadpoles, we have been able to show a definite antagonism between the antihistamine benzhydryl-β-piperidinoethylether hydrochloride (Spofa III 101) and thyroxine. 120 tadpoles (*R. temporaria*) were equally divided into four tanks containing 1,000 c.c. water at 20° C. The water was ventilated with air. The animals were fed with dried heart muscle. The water was changed daily, and the drugs used were added freshly every day. The experiment lasted twenty-seven days. The drugs were added as follows:

Group I: Controls.

Group II: Thyroxine 6th–11th day (20 μgm. per 1,000 c.c. water daily).

Group III: Thyroxine 6th–11th day (20 μgm. per 1,000 c.c. water daily) and antihistamine 1st–27th day (2 mgm. per 1,000 c.c. water daily).

Group IV: Antihistamine 1st–27th day (2 mgm. per 1,000 c.c. water daily).

On the twenty-seventh day the thyroxine-treated animals (group II) had well-developed hind and front legs and a largely atrophied tail. The control tadpoles (group I) were more than twice as large, but only the buds of their hind legs were just visible. The tadpoles treated with both antihistamine and thyroxine (group III) were about twice as large as those treated with thyroxine only, and although their hind legs were partly developed there were no signs of any front legs. Their tails had not started to atrophy. The animals in group IV seemed at the same stage of development as the control animals, but later on they showed signs of slowed-down metamorphosis. Thus we showed that the antihistamine drug Spofa III 101 clearly inhibits the effect of thyroxine and also slows down the spontaneous metamorphosis of tadpoles.

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[1] Szebehely *et al.*, *Nature*, **165**, 155 (1950).