THEME OF THIS INVESTIGATION

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Despite the study and synthesis of a large number of organic compounds which are capable of showing one or more of the smectic, nematic and cholesteric mesophases, it is not easy to postulate the existence of a particular mesophase in a particular compound. In order to establish the relationship between molecular structure and mesomorphism and the influence of molecular structures on liquid crystalline properties and phase transitions, many homologous series comprising various molecular structures and dimensions have been studied, These studies have revealed that mesomorphic properties vary in each series depending upon the molecular structures of the compounds. It was, therefore, considered necessary and interesting to synthesise some homologous series with molecular pecularities which could be related to the mesomorphic trends found for the corresponding series, and thus throw further light on the subject of chemical constitution and mesomorphism.

Mesomorphism in binary systems has also been investigated. Mixed liquid crystal formation has been studied in the nematic phase but it is rather surprising that no such studies are reported in the smectic phase. It was, therefore, thought worthwhile to investigate some binary systems in which one component was a smectic liquid crystal and the other a non-liquid crystal and to study the effect of the molecular composition of the non-mesomorphic component on the mesomorphic properties of the smectic component. The smectic mesophase is a system of stratified

molecular arrangement where rod-shaped molecules lie parallel in each stratum. Another substance dissolved in such a smectic liquid would be in an anisotropic environment and should affect the properties of the mesomorphic substance in an interesting manner. Such a study, it was thought, would throw light on the nature of the mesomorphic state in relation to the chemical composition and smectic mixed liquid crystal formation.

The present investigation was, therefore, undertaken with a hope that such studies will enhance our present state of knowledge about the nature of the mesomorphic state in a fruitful manner.