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THE SWARM STRUCTURE OF THE LIQUID CRYSTAL, PARA-AZOXYANISOL

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The liquid crystal of para-azoxyanisol has interesting properties. The phase consists of swarms of molecules. In each the molecules are oriented parallel and all of them in a swarm unite in action in response to a magnetic field. The liquid crystal phase at the transition point has a greater density by 0.43 per cent than the isotropic liquid. Experiments have indicated that each swarm consists of about 10^6 molecules, but with varying size over an indefinite range. There has been a difference of opinion as to whether or not there are considerable spaces between the swarms (Ornstein and Kast, Faraday Soc. Proceedings, 1933, p. 931 (939)). If there is a considerable space, we would expect that when the swarms are oriented parallel by the magnetic field, there would be a swarm growth or an extension of the parallelism of the molecules into these spaces. This would alter the density. Consequently it is interesting to measure the density change when the magnetic field is applied. The result of our experiments is that the change in density is less than 10^{-6}. This would argue against the considerable spaces and for a very flexible shape of swarms with a very small total volume of regions of randomly oriented molecules.

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