Inevitably a publication of this kind cannot satisfy every requirement and the choice of the 40 topics is necessarily somewhat arbitrary: for example a rather obvious absentee is 'defects', or something equivalent to it. It might be expected, too that the author index would include books and not simply journal publications. However, these are no more than small blemishes on what seems a very worthwhile publication, providing a lot of information not previously accessible.

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The physics of liquid crystals. By P. G. DE GENNES. Pp.xi + 333, Figs. 130. Oxford Univ. Press, 1974. Price £11.50.

This book is based on Professor de Gennes's lecture notes on the physics of liquid crystals. Anyone who has attended his lectures knows what an inspiring teacher he is and how much he has influenced recent researches in this field. The book certainly succeeds in conveying the author's enthusiasm for the subject and also in highlighting some of the important questions that still remain to be answered.

Chap. 1 describes the main types of liquid crystals, their structural features and properties, with typical examples of the 'building blocks' that give rise to the mesophases. Chap. 2 deals with long and short-range orientational order in nematics. The order parameter is defined and related to macroscopic properties, such as the anisotropy of the diamagnetic susceptibility, *etc*. Statistical theories of long-range order – the hard-rod model and the Maier–Saupe treatment – are then outlined briefly. This is followed by a discussion of the Landau–de Gennes model and its applications to static pretransitional short-range order effects in the isotropic phase.

The principles of the continuum theory of nematics are introduced in Chap. 3. The Oseen–Zocher–Frank equations of curvature elasticity are set up and applied to various problems, *e.g*. the static theory of distortions, the orienting influence of walls, magnetic and electric field effects, fluctuations and light scattering. The chapter ends with a discussion of Ericksen's general definitions of stresses and torques. Chap. 4 describes with illustrative photographs the various types of defects and textures in nematics arising from singularities and discusses their significance in terms of the continuum theory. Chap. 5 deals with the dynamical properties of nematics. The basic equations in the Ericksen–Leslie as well as the Harvard formulations are examined and compared, and the various techniques of measuring the coefficients of viscosity are surveyed. The problem of electrohydrodynamic instabilities, which is a topic of importance in electro-optic display technology, is considered in detail and finally methods of studying relaxation phenomena in nematics are reviewed.

Chap. 6 is devoted to the cholesteric liquid crystal which is the twisted form of the nematic. It begins with a theoretical treatment of the unique optical properties of this phase and then goes on to discuss the extension of the continuum theory of nematics to allow for the helical symmetry. The rest of the chapter covers the static theory of distortion by magnetic fields, flow and permeation, electric field effects and convective instabilities, thermomechanical coupling and the Lehmann rotation phenomenon, defects and textures.

The last chapter deals with smectics. Attention is confined mainly to the *A* and *C* types as the structures of the other smectic modifications are not yet completely understood. The continuum theory of smectics is developed and applied to problems of static and dynamic distortions in the structure. The chapter concludes with a discussion of phase transitions and precritical behaviour. In particular, the smectic *C*–smectic *A*, the smectic *A*–nematic and the smectic *C*–nematic transitions are considered and formal analogy is drawn with transitions in superconductors and superfluids.

There is one unfortunate feature of the book which it is the reviewer's duty to record. It contains an inordinately large number of 'typographical' errors, many of which are by no means of a trivial nature and might be disconcerting to a beginner. There are some 50 errors in the mathematical expressions and 17 errors in the figure and equation numbers referred to in the text. The figures themselves are carelessly drawn. For example, in Fig. 3.7 showing the twisted nematic, the axis of twist is marked as 'the easy axis of wall 2'; in Fig. 3.20(*b*) illustrating the origin of flexoelectricity in a nematic subjected to a bend deformation, some banana-shaped molecules have their dipoles pointing out from the concave side and others from the convex side; in Fig. 7.4 giving phase diagrams for mixtures of smectics *A* and *C*, the latter is shown as the higher-temperature phase.

It is nevertheless a valuable book written in an inimitable 'open-ended' style and studded with beautiful examples and solved problems. Altogether, it is a must for everyone interested in liquid crystals.

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