crystals. The authors have given strong emphasis to predictions of many physical properties related to the phonon frequency spectrum, calculated by means of lattice-dynamical phenomenological models whose parameters can be determined from macroscopic data.

The book is written by two physicists engaged in theoretical research work on lattice dynamics of alkali halide crystals. Consequently, the data presented are largely the result of their long collaboration in this area.

The opening chapter offers a historical background of the subject permitting the reader to follow the development of ideas and to realize the contributions some individual scientists have made to the progress of this field.

The next two chapters are devoted to the general theory, introducing the normal coordinates and describing the macroscopic and microscopic theories of long-wave optical vibrations of cubic ionic lattices. In this part, the authors also give a detailed description and justification of various dipolar models, including a derivation of the dipolar coupling coefficients.

In chapter IV, a very interesting comparison of theoretical and experimental single-phonon data, such as Debye–Waller factor and specific heat, is presented. The remainder of the chapter is devoted to reviewing the technique of inelastic neutron scattering for determining the normal modes of a crystal lattice and to comparing the measured and calculated dispersion curves for almost all alkali halides. The side-band spectra of fundamental infrared absorption and the second-order Raman spectra of alkali halides are carefully discussed in chapter V.

Chapter VI deals with the static behaviour of alkali halides, specifically the manner in which these materials respond to the presence of point imperfections. The theory of impurity vibrations is used to calculate the various physical effects of impurity mismatch. The later part of the chapter discusses the use of techniques employed in the study of dynamical problems, suitably modified, to treat static problems that arise in connection with the study of lattice imperfections.

In conclusion, the authors have presented a very useful book which should be recommended to the research worker in lattice dynamics and statics of alkali halide crystals.

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N-dimensional crystallography. By R. L. E. SCHWARZENBERGER. Pp. iv + 139. London: Pitman, 1980. Price £6.50.

After introductory chapters (I: *Symmetry in the plane*, II: *Groups of affine transformations*) the central theme of this book appears in III: *Space groups*. Their *Determination* (VI) is preceded by IV: *Point groups*, and V: *Lattices*. The last chapter is VII: *Deformations*.

Both the title and the flap text seem to suggest that, apart from mathematicians, crystallographers will be interested by this book. Indeed the chapter titles could well be those of an introduction for them – but the reader will soon discover that this a research note in mathematics, period. Even the explanatory appendices turn out to be addressed to old-fashioned mathematicians rather than crystallographers of whatever fashion. The appealing first chapter, too, does little more than express what we all know in terms of formal algebra; at least that is how the author's 'geometrical approach' will be judged by most members of our picture-prone profession (actually there are some well-meant attempts at illustration). When even just a hint of true modern algebra enters in chapter II one feels one should either stop or get hold of the relevant books (which unfortunately are not specified) and take some weeks' leave. The reviewer has done neither, and has continued browsing. Though the meaning of many words and symbols has to be derived from the context, more of the book is readable than appears at first sight, and certainly more than in most of the existing literature of this level.

The strategy for deriving n-dimensional space groups is well explained. Since most of the text deals explicitly with the cases $n = 2$ and 3, either fully or in examples, there is much to be recognized and, sometimes, reappraised. Often one has the sensation of reading a foreigner's account of a journey through one's home country. This fellow notices features overlooked by most of the inhabitants: in the present case, the all-important rôle of arithmetic classes and of colour groups is perhaps foremost among them. Topological and other mappings of Bravais types, lattices, orthogonal groups and even space groups onto certain other sets are sometimes very difficult, but so fascinating that one makes a try anyhow to grasp the essence. This is also true for what appears to be the author's most personal contribution: derivation of orthogonal spacegroups by using their equivalence to graphs. On the negative side there are a deplorable number of printing errors, both misprints and mere vacancies, some of them quite nasty for the uninitiated. Mathematical rigour, too, is lacking surprisingly often. On p. 4 the shift vector (differing from ours in an interesting way) is said to be 'non-zero' in a case (*e.g.* m in cm) where it can actually be chosen zero. Except for $\bar{3}m$, all holohedral groups are assumed on p. 60 to contain m's normal to all rotation axes and the assumption is never dropped ($m3m$!). Orthogonal point groups are defined so as to include 222 but that group is forgotten in the list (p. 55) and in counting them. So the autochthones can feel satisfied: the foreign traveller himself is not perfect either. They should be grateful, however, for the publicity given to their beloved country, as well as for the impulse to look at their problems in this unusual, often very revealing light.

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