Point group theory tables
By S. L. Altmann and P. Hertzig

This is, as the title states, a book consisting primarily of tables; not only for the crystallographic point groups, but also for the icosahedral group, the infinite dihedral and cyclic groups, and the finite dihedral and cyclic groups for axes up to order 10. For these groups, the authors give diagrams, character tables, representation matrices, product and branching rules and Clebsh-Gordan coefficients. The coverage is thorough and well organized. I particularly appreciated the mini-table of contents that appears at the foot of each page of tables.

A useful and comprehensive introduction to the tables is given. This provides key references but, conversely, assumes some familiarity with the literature. One would not expect to learn group theory from this book, and clearly that is not the intention.

As I am somewhat biased towards the alternative tables of Butler [P. H. Butler (1981). Point Group Symmetry Applications: Methods and Tables. New York: Plenum], my first impulse was to compare the listings. Such a comparison brings one immediately face to face with the issue of basis and phase choices, and emphasizes that it is essential to stick to one consistent set of tables. It also reveals a difference in philosophy. Altmann & Hertzig are careful to define the basis functions before generating Clebsh-Gordan coefficients. I prefer Butler's approach of first defining phase choices, then deducing basis functions, and working with the more symmetrical $3 jm$ factors rather than Clebsh-Gordan coefficients. Nevertheless, I suspect that many users will find this book much more comfortable to work with than Butler's.

The serious shortcoming that both books share is that to do a real calculation the user really does not need several hundred pages of tables, but access to appropriate computer programs. In neither case are such programs forthcoming.

The book is remarkably free from errors. Given the obvious care that has gone into making it so, I was surprised to find that the crystal-field potential given for $f$ electrons in the problems section omits the $l = 6$ operators. However, this is a relatively minor blemish in a work of this complexity.

As a self-consistent set of tables, this book is currently unrivalled. It will be an essential reference for anyone interested in point-group calculations. However, the main audience will most likely be spectroscopists - there is little in this book for the pure crystallographer. The Hermann-Mauguin notation is downplayed and, of course, this is a book of point-group tables.

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