not clearly visible here, though there is a discussion of the 2×2 matrix methods used.

From K_0 and its basic structure he leads on to K_1 and Bott periodicity. These topics are developed clearly, and in a standard way. The K-theory of crossed products based on the work of Pimsner, Voiculescu and Connes is given. There is a discussion of the theory of extensions of C*-algebras leading to the Brown–Douglas–Fillmore theory. One of the definitions of Kasparov's KK-theory is given in detail. Sometimes the back references in the book are not as clear as could be desired. It has some of the lack of polish of lecture notes, but this makes the mathematics feel alive.

This book is a good contribution to the literature on topology and operator algebras. It is exceedingly helpful for those who wish to read the current research in K-theory and KK-theory, for example the recent work of G. Kasparov and J. Cuntz. Blackadar's book is essential reading for those who wish to study C*-algebras seriously.

A. M. SINCLAIR

LEDERMANN, W. *Introduction to group characters* (Cambridge University Press, Cambridge, 2nd edition, 1987), pp. 225, hard covers, 0 521 33246 X, £27.50; paper, 0 521 33781 X, £8.95.

The central theme of this well-received text, which is not greatly changed from its first edition, is the character theory associated with the matrix representations over the complex number field of a finite group. The level of presentation, which is aimed avowedly at final honours or beginning postgraduate students, requires only a comparatively modest acquaintance with linear algebra and finite group theory. Partly because problems of the non-semisimplicity of representations do not arise, the text focuses not so much on modules as on actual matrix representations. This has the considerable didactic advantage that the text becomes immediately alive and meaningful so that the novice can quickly get his hands dirty by performing actual calculations to determine characters. The text abounds with worked illustrations and the many exercises are provided with solutions. This book leads the student to an appreciation of the insights of the great classical masters of the subject; thus he will meet the various theorems associated with the names of Burnside, Frobenius and Schur, for example, the Frobenius reciprocity theorem for the character relations between a subgroup and a group, the innocent-looking Schur's lemma and Burnside's (p, q) theorem. Some of these insights, such as the use of the so-called Schur functions to elucidate the characters of the symmetric group, were gleaned through ingenuity in the use of determinants, a topic which is less familiar nowadays, and, in consequence, additional material on this has been provided in an appendix. On encountering Burnside's theorem the student is led to reflect that its proof, which could be said to depend on a condition for the equality of the modulus of a sum of several complex numbers with the sum of their moduli, was a foundation stone for an edifice of much finite group theory but that some fifty odd years were to elapse before a purely group-theoretic proof was to appear. Throughout the text the exciting interplay between number theory and representation theory is stressed.

The general mathematical reader, the theoretical physicist in need of representation theory and the student beginner have much to learn from this fascinating account which is a clear and careful propaedeutic to other deeper, but often less perspicuous, treatises. The author acknowledges that his interest in the subject was first aroused by attendance at lectures by Schur, himself a pupil of Frobenius; the present reviewer in turn is glad to express his debt to Professor Ledermann who inspired his own first researches in group representations. It is therefore a pleasure both to welcome and to recommend this pedagogic distillation of Professor Ledermann's group-representational experience.

D. A. R. WALLACE