functional calculus again in such a way that it can be applied to algebras in which the spectra of elements need not be compact.

The subject of this course is inevitably highly technical and the author has made great efforts to ease the lot of the reader by a colloquial style and a liberal use of heuristic discussion. However, the reader will still have to work hard.

F. F. BONSALL

DUBIN, D. A., *Solvable Models in Algebraic Statistical Mechanics* (Oxford Science Research Papers, Oxford University Press, 1974), £5·25.

The branches of mathematics most useful to statistical mechanics are functional and complex analysis, ergodic and probability theory, and the theory of C^*- and W^*-algebras. In return, the " rigorous " approach to statistical mechanics has led to new ideas in these subjects. Solvable models, providing a good qualitative picture of actual physical systems, are also useful as mathematical laboratories. In this way, statements plausible " for physical reasons " often become theorems of some interest to pure mathematicians.

This book is a survey of the simplest solvable models, selected and explained by a mathematical physicist.

It is not a book of pure mathematics, and it may be hard reading for a mathematician, because of both the style and the content. It would repay extended study, especially if this leads to new directions and emphasis in the classical subjects.

R. F. STREATER

MASON, J., *Groups, a Concrete Introduction using Cayley Cards* (Transworld Student Library, 1975), 125.pp., £0·85 (soft cover).

This original and engaging little book on elementary group theory draws on the author's experience in presenting the material for a second year course at the Open University, and discusses groups, subgroups, homomorphisms and the first homomorphism theorem, permutations and Cayley's Theorem, using so-called " Cayley cards ".

First, the alternating group A_4 is presented graphically as a pack of 12 cards, each with two sets of 4 dots down two opposite sides, the dots being joined in an obvious way so as to present the permutation involved (3 packs of cards are included with the book). The group operation is juxtaposition of cards, and associativity is inherent. Then, using these cards, ideas are illustrated in the group A_4, and in other groups, before they are introduced abstractly. Thus the author is able to discuss the difficulties encountered when coping with abstractions, and in fact a large part of the book is concerned with the learning process itself. The student is made to work with the Cayley cards so as to render concrete the various notions met, thus avoiding the danger of abstract algebra being too " abstract ". One drawback to this approach is that the student's ability to manipulate abstract symbols is not developed sufficiently, but perhaps this may wait for a more advanced course; indeed, a final section contains suggestions for further reading. Two excellent features (among many) are a final review of the concepts met using the quaternion group of order 8 in place of A_4, and the tightening of Cayley's theorem to show that A_4 can be retrieved as a subgroup of S_4 rather than as a subgroup of S_{12} (in the usual notation).

There are some faults. Major results are buried in worked exercises, cyclic groups are covered too quickly and in an obscure fashion, and at times the argument develops too rapidly. More unfortunately, there are errors in Exercises 2.7, 3.1 and 5.15, the logic in Exercises 2.6 and 3.21 needs to be tightened, and there are some misprints in

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the text. As well, it is not clear at times whether the group under discussion is supposed to be finite.

Hopefully, these defects will be removed in a second edition. Meanwhile, with some supervision, a student will find working through this book an interesting educational experience, and an enjoyable introduction to group theory.

L. O'CARROLL

DEDRON, P. and ITARD, J., *Mathematics and Mathematicians*. Translated from the French by J. V. Field, 2 vols (Transworld Student Library, 1974), Vol. 1, 325 pp., £1·50; Vol. 2, 222 pp., £1·00.

These two small octavo volumes, containing an astonishing amount of valuable material, provide a " history of mathematics " written to a new recipe. According to the authors' preface, the work " does not claim to be even a brief history of mathematics or mathematicians. It offers varied and fairly straightforward material in the hope of provoking a certain amount of reflection about the birth and development of mathematical sciences." The authors confine themselves to elementary mathematics, their survey ending at the beginning of the nineteenth century; and even then the treatment is highly selective. Thus there is no detailed account of the rise of the infinitesimal calculus; instead we are given a long and illuminating quotation from d'Alembert on its metaphysical principles. The restriction to early mathematics undoubtedly makes the work more accessible to the non-specialist, but at the same time there has been no sacrifice of standards of scholarship. A most valuable feature of the presentation is the number of extracts from original sources. While these may require the reader to switch to an archaic idiom and a different pace of thought, and to put up with a certain amount of long-windedness (as in the extract from Plato's Theaetetus) he is usually compensated by the clearer picture that emerges of mathematical concepts in their nascent state. The mathematical pages are frequently enlivened by biographical or anecdotal interludes.

The first volume having surveyed topics from Greek geometry through Napier and logarithms to the " golden age " of the seventeenth and eighteenth centuries, the second goes on to discuss the development of certain mathematical methods and famous problems. Some idea of the ground covered in this volume is given by the chapter headings: Written Numbers and Numerical Calculations; Algebraic Notations and First Degree Problems; Second Degree Problems; Pythagoras' Theorem; Trigonometry; Duplication of the Cube and Trisection of the Angle; Squaring the Circle.

The translation reads fluently; few misprints have been noted, and there is a bibliography and a good index. The choice of the book as a prescribed text for the Open University Second Level Course in History of Mathematics seems entirely appropriate. In spite of its small size this is a work of real distinction.

R. SCHLAPP

POPP, W., *History of Mathematics: Topics for Schools* (Transworld Publishers Ltd., 1975), vii+150 pp., £0·85.

The number of recent books tracing the development of mathematical concepts is evidence of a growing realisation that a historical perspective can be a useful auxiliary in the teaching and learning of mathematics at all levels.

The little book under review is a translation by Professor Maxim Bruckheimer of Walter Popp's *Geschichte der Mathematik im Unterricht*, first published in 1968, and is intended for the mathematical novice. It provides an introduction to the development of some of the major topics of school mathematics; it is no part of the author's plan to give biographical information. The material is divided into two parts, described